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Wire Tramways.

THE wire tramway seems to be calculated to perform work that can scarcely be expected from any railway with two rails, no matter how narrow the gauge. We do not think that this can be taken as a mathematical proof of the correctness of the principle of narrow-gauge railways, according to the theorem that whatever is true up to the limit is true at the limit. The fact that they are specially adapted to the transportation of heavy loads over rough and mountainous countries, where the construction of railroads would be expensive and difficult, will give them a permanent value.

The first tramway of this kind was, we believe, constructed by Mr. PETER COOPER, many years ago, for transporting iron ore, coal and limestone to the top of a blast furnace near Phillipsburg, N. J.

It is somewhat singular that it should have taken so long to introduce this convenient appliance. But the ball, when once set rolling, is difficult to stop. We learn that there are three of these tramways on an extensive scale now in process of construction—one in Nevada, one on the island of St. Kitts, and the third near Prague, in Bohemia. From an English engineering periodical we learn that the Indian Government are applying it to the development of the extensive salt mines in the Punjaub, on a very large scale, and Messrs. GIBBS, BRIGHT & Co. have forwarded a line to the coast of Chili, for the development of coal mines which have recently been opened. It is almost a truism to observe that, as civilization advances and the occupation of unpeopled tracts extends, the question of transport becomes daily more important, and more particularly the question of minor or supplementary transport, for which alone this system is applicable. The improvements in traction engines are gradually creeping in in aid, or replacement, of horse labor in almost every county in England. They, however, require roads and a tolerably level country, whereas the wire tramway forms its own road and cares nothing for spans in mountain regions of 1200 feet or 1500 feet and inclines of 1 in 3 or 4. It therefore has its special applicability, and must be made use of in a hundred instances where other means of transport are wholly inapplicable. Like all newly-introduced ideas, it has taken no little time, no small expense, and, above all, no small amount of energy and perseverance to bring it to its present position. Simple as is the idea, its application to the ever-varying conditions, different kinds of transport, and different natures of country, have severely taxed the resources of the staff employed in its development; but it may now be said that the type of almost every case of application has been successfully established, and there can be little doubt of the applicability of the system to most of the contingencies of mineral and agricultural transport. The line in Nevada is a most remarkable one, and we hope to be able to give plans and sections of it in a future number. It was constructed during the snows of the late severe winter, and is nearly three miles long, and has inclines in some places of 1 in 3, the total average fall being about 1 in 7.

A New Weighing Machine.

AN exceedingly simple and convenient apparatus for weighing heavy articles, such as ordinary merchandise discharged from ships, has been introduced into the Government dockyards and arsenals, and the work-shops of the principal engineering firms in England. The capacity of the machines now in operation varies from ten hundred weight to fifty tons, and after being subjected to a lengthened test of hard practical work, they have received the universal commendation of those who have used them. They are known as DUCKHAM'S Hydrostatic Weighing Machines. The apparatus is simply composed of a piston and cylinder, which may be suspended for use from any crane hook; it is filled with water, which has a connection with an ordinary hydraulic pressure gauge fixed on the exterior of the machine. The piston rod passes downward through the cylinder bottom, and forms a means of attachment for the goods. Immediately these are lifted, as in loading or unloading ships or wagons, the weight is shown on the gauge dial without the slightest extra labor or manipulation, and, consequently, without cost. The piston is fitted with cupped leathers of such a shape as entirely to obviate leakage, as the water cannot thereby escape, and is in itself incompressible. There is no movement of the piston, and, consequently, no friction to affect the accuracy of the weight denoted. Moreover, to insure absolute correctness, each dial is marked to indications given by the attachment of actual adjusted weights or strains to each machine. One of the most noteworthy features in connection with this invention is, that whereas the few weighing contrivances which exist in other design of large capacity are almost too unwieldy to be worked at all. A DUCKHAM 30-ton machine complete weighs only 2¼ cwt. It may be transported from place to place and attached for use by a single man. The 1-ton machine has a piston area of only 7 in., and weighs only 18 lbs. It is only necessary to regulate the strength of the metal to obtain a weighing machine light and delicate for low weights, or a machine combining in an eminent degree lightness and portability, but of sufficient power to indicate any amount of strain which can be possibly applied to it.

The East River Bridge.

[Continuation of the Report of the Chief Engineer.]

FILLING UP OF THE AIR-CHAMBER.

The operation of the two supply-shafts has already been described. Their capacity proved ample for all requirements. Concrete was laid at the rate of one hundred yards per day of sixteen hours. As the space became more contracted, this quantity was reduced. A great saving in time as well as amount of concrete was effected by letting the edges of the caisson sink into the ground 3½ feet deeper than the average level of the bottom. This reduced the height of the air-chamber from 9 feet 6 inches to 6 feet, and diminished the amount to be filled in about one-third. The concrete consisted of one part of Rosendale cement, two of sand, and four of small-sized gravel. The sand and cement were mixed above, and passed through one shaft, the gravel through the other. The gravel came from the Long Island beaches, where the action of the waves had washed it absolutely clean, and sorted it in layers of uniform size. During most of the time, the weather outside was so cold that the concrete had to be mixed below. At a later period, it was mixed above, and sent down directly. No trouble was ever experienced from its setting before it was spread out and rammed, nor did it ever set in the supply-shafts; much labor can be saved thereby in the air-chamber. The gravel being full of frost, frequently froze fast in the shafts; this was obviated by introducing a steam pipe, and thawing out each charge. The boulders which had been taken out of the caisson were broken up into square blocks, and again built in below with the concrete. The general mode pursued in the filling was to build narrow bulkheads from three to four feet wide from the floor to the roof all around, the sides being kept vertical by boards which were removed after the concrete had hardened. Next to the roof a shallow sloping layer was rammed in with narrow flat-faced iron rammers. This place required careful watching, as it was apt to be slighted, and yet was the most important point in all the filling. The small gravel answered very well for this purpose. When in making the repairs of the fire it became necessary to cut out a considerable portion of concrete, it was found that the part next to the roof was the most compact portion of the whole. Every layer of concrete was allowed to remain for five hours before another was put on. The total quantity required was about 4,000 yards, including the brick piers. The rapid influx of fresh water springs prevented any material reduction of the air-pressure. The water-shafts were cut away below, and filled up with concrete to the line of the roof. After the cavity was filled, and the air-pressure taken off, it was found that sufficient water leaked through the concrete to fill the shafts to the top. They were then filled from above with concrete lowered down in self-dumping buckets. The caps to these shafts should have been provided with small air-locks, so as to fill them in the dry. The water rising in these shafts was perfectly fresh, without a trace of salt, which shows that the timbers will be saturated with fresh water. Its temperature was remarkably high, seventy degrees, whereas that of pure spring water is fifty-five degrees, and of the river fifty degrees. This would indicate that the whole mass of timber and concrete must have been heated up to the temperature existing in the air-chamber, which averaged from seventy to eighty degrees throughout the winter, and was even greater up in the timber, where all the hot air was concentrated. It is also probable that the water penetrating the concrete, as soon as the air-pressure ceased, would produce some heat by contact with the small quantity of free lime then existing. The concrete filling was permeated by air throughout. Even when the last charge was put in, the air still bubbled up under the edges of the caisson, requiring a passage of fifty feet through the concrete.

FIRES.

The danger from fire in an atmosphere of compressed air is very serious, and becomes doubly so with a wooden caisson penetrating a water-tight stratum. Already, at a pressure of twenty-five pounds per square inch, the flame of a candle will return when blown out, and all inflammable materials have to be carefully banished. Several minor fires at the beginning showed the necessity of caution. One was of sufficient magnitude to demand the flooding of the caisson, which was then easily accomplished, because the water entered freely under the shoe as the air escaped through valves provided for that purpose. When, therefore, the fact was settled that the river water was permanently excluded from the caisson, it became a matter of primary importance to guard against fires, and accordingly two hose connections were provided, throwing streams of 1½ inches at 65 pounds pressure. Steam pipes were introduced, connecting with boilers outside. In addition, all seams between the roof timbers were carefully pointed with cement, and iron shields provided over the permanent lights. It was made the special duty of two men to watch continually over all lights. Notwithstanding all these precautions, there was a seam where the supporting frames join the roof that had not been pointed; an empty candle-box was nailed under it, in which some man kept his dinner, and, while getting it, he probably held a candle against the roof for some time. This proved to be the heel of Achilles, a fire being discovered there on the evening of December 2. Being directly over the frame, it remained undiscovered until the latter had been partially burnt through. From its size it is supposed to have been burning for several hours previous. A slight stampede ensued among the men, but no one left the caisson. All appliances for putting it out were brought to bear. While the hose was getting ready, two large cylinders of carbonic acid gas, under 225 pounds pressure, were discharged into it, without producing any effect whatever. As soon as the stream was stopped, the timber would re-ignite immediately. The two streams of water, however, soon extinguished all fire that could be seen at the time. There was a violent draft of air through the burnt aperture. This was stopped with cement, and the two streams of water were allowed to play in the hole for two hours. At the end of that time one of them was replaced by steam at 90 pounds pressure, and allowed to run for half an hour. It was impossible to ascertain whether the steam was of any benefit. It was, therefore, shortly stopped off, and the water turned on again. The steam may even have aided the draft. In the meantime the question of flooding the caisson was seriously discussed. To extinguish the fire without having recourse to this resort was very desirable—yet, on the other hand, if the fire was not out, it was simply a question of time how soon the entire structure would be destroyed.

One great objection to the flooding was the condition of the water-shaft, which was capped above and resting below on some boulders. A gang of men were busy all night digging them out. The flooding would necessarily be accompanied by some settling of the caisson, since it was equivalent to an extra weight of 28,000 tons; and if the water-shaft came down on the boulders it might become so crippled as to impair the tightness of the caisson permanently. The problem to be solved in the flooding was to substitute the compressed air by the water poured in through the water-shafts from above, and to so regulate the escape of the air as to always maintain the same pressure against the roof of the caisson, even up to the last inch below the roof, until the water had entirely replaced the air. The supply of the former would, of course, be limited and variable, and if the air should be all out before the water had reached the roof, the result would be a sudden drop of the caisson, and the destruction of all supports by the fall of a weight of 28,000 tons, beside running the risk of causing the caisson to leak so badly as to render its reinflation impossible. The situation was entirely different from that at the first fire, when the water rushed in under the edges as rapidly as the air escaped, and thus maintained a uniform pressure at all times. These various considerations unfortunately appeared of great weight at that time; and under such circumstances of mental excitement and bodily prostration; it was concluded first to exhaust all other means for ascertaining whether the fire was out. This resolve was strengthened by the fact that, at 4 A. M., the water thrown by the hose ran back through the orifice into which it was thrown, thereby leading us to think that the burnt cavity was filled with water and could hold no more. The only way to ascertain the presence of fire was to bore for it at random through the solid timbers. A number of holes were bored up for a distance of two feet. They showed no fire. Others were then bored up for three feet, showing no fire. This result was of course encouraging. Time was lost in lengthening out augers, and also in the boring, because the draft carried the chips up. At 8 A. M., a hole four feet high revealed the dreaded fact that the fourth course of timber was one mass of living coals. All available engines of the fire department were soon at work pouring water into the other water-shaft. Additional forces were brought up by and by. The *Fuller*, a harbor fire-boat, supplied eight powerful streams, the *J. L. Tebo* three, and the Navy-Yard tug two more. By 10 A. M., thirty-eight streams of water were flowing into the caisson, beside the water from the pipes in the caisson itself.

Our water-shafts most certainly proved their value in this instance. Without them the introduction of such a quantity of

water in so short a time would have been out of the question. By 3½ P. M., the air-chamber was filled. Total quantity of water required, 1,350,000 gallons. The escape of air was regulated by the pressure gauges; at times it escaped too rapidly; the pumps were started to restore the pressure. When the water had reached within two feet of the roof, the escape of air through the large valves was thereby cut off, and the balance escaped by leakage and through two small 1¼ inch pipes, reaching within a half-inch of the roof. During the latter stage, the pressure fell at one time from nineteen to ten pounds. The settling of the caisson of two inches was probably due to that. After the flooding, the water in the shafts was kept ten feet above tide level, and remained so with very little feeding, thus showing that the earth was practically water-tight under the shoe. The caisson remained flooded for two and a half days. Six hours were required to force out the water again. It all ran out over the top of the water-shafts, requiring about 22 pounds of air pressure. The structure proved tighter than before the flooding, owing to the swelling of the timber. An inspection below showed but little apparent damage, beyond blocks that were crushed and some posts thrown over. The building of the brick piers was at once resumed, and completed in two weeks, and the caisson lowered down on them through the remaining distance of two feet. For several weeks subsequently the odor of turpentine and other products of the combustion of yellow pine was very strong above the caisson, being forced out with the air bubbles. They gave rise to very unpleasant suspicions, which were happily dissipated by time. A large quantity of frothy pyroligmic acid also made its appearance on top of the masonry, showing that a destructive distillation of wood had been going on. This continued for over three months, as long as any air remained below.

EXTENT OF FIRE, AND REPAIRS.

About 200 borings were made in the roof of the caisson for the purpose of ascertaining the extent of the fire, both laterally as well as vertically. It was ascertained that it was confined to the third and fourth courses of timber, but had spread out laterally in many different directions, covering a much larger area than was anticipated, the remotest points being some fifty feet apart. The fact of the air rushing out through every bore hole seemed to show that we had to depend upon the immediate roof for retaining the compressed air. Hence the first conclusion arrived at in regard to making the repairs was to wait until the air-chamber had been partly filled in around the edges, then to let off the air pressure entirely, trusting to the pillars and concrete to support the weight, and whatever spring water came in was to be pumped out. Large holes could then be cut in the roof and the repairs made, provided the water did not come in too fast through the timbers. It was very desirable, however, to gain time and do as much as possible at once, while the air-pressure was yet on. This made it necessary to check in some way the loss of air attending the cutting away of the timber. With this object in view, it appeared advisable to inject cement into the burnt cavities through the bore holes until the leakage was stopped. Accordingly a small cylinder was prepared with a piston and a one and a quarter inch injecting pipe, and when freshly filled was placed under a hole, and the cement forced up by a screw jack. This worked well. Experiments showed that a mixture of one part of cement and one of sand could be forced a distance of ten feet through a small pipe and then would spread out laterally to some distance. As soon, however, as a certain moderate amount of resistance was experienced, all the water would be squeezed out, and it became impossible to force the charge another inch. We soon found that the mere suction of air through the blow holes was sufficient to draw up the cement loosely through a pipe. When a hole was clogged the stuffer was applied to compact it. By these means 600 cubic feet of cement were injected and all blowing of air ceased. A number of trial bore holes failed to disclose any space not filled with hard cement. We already flattered ourselves that this filling might answer every purpose, but, in order to make sure one large hole of six feet square was cut up into the roof through a length of five courses, directly over the place where the fire had originated. Here we found that the cement had indeed filled all vacant spaces, but that the timber was covered with a layer of soft and brittle charcoal varying from one to three inches thickness. There was no other alternative now but to go to work and cut in a sufficient number of openings, remove all the injected cement, and carefully scrape the charcoal from every burnt stick of timber. This task required eighteen carpenters, day and night, for two months, beside the attendance of common labor, and delayed the filling up of the air chamber by fully four weeks. The work was extremely disagreeable and unhealthy; men had to lie for hours in confined spots, without room to turn, and breathing a foul mixture of hot candle-smoke and cement-dust combined with powdered charcoal, and under pressure at that, the temperature being eighty degrees. In proportion as the cement was cut away, the full extent of the fire gradually began to dawn upon us. In place of one opening in the timber, five were required in order to reach the remotest points. They varied from three to four feet square in size. Above the first opening the fire had destroyed the third, fourth and fifth course, having burned through the tin which lies between the fourth and fifth, and also one or two cubic feet of the sixth course. In this latter course the timbers are laid three inches apart with concrete between. This concrete checked all further spread of the fire in the sixth course, and in every other spot, except above the large opening, the tin had acted as an effective barrier. The fourth course under the tin was the principal sufferer. The various ramifications of the fire had evidently been controlled by air leaks. In several places one stick was burned away for thirty feet, and the adjoining ones remained sound. The fattest sticks had succumbed the soonest. Since the timber was laid in courses at right angles, there was an opportunity for the fire to branch off in a zig-zag direction, leaving one stick and passing off in another course to the right or left, and up or down. The general combustion, however, was of the nature of a slow charring, progressing equally in all directions. Whenever a stick was only partially consumed it was carefully scraped and the cavity crammed full of cement. The larger spaces were filled up with yellow pine forced in with screw-jacks and wedges, in lengths of from eight to ten feet and well bolted vertically and laterally. Care was taken to break joint and to scarph as much as possible. It was difficult to introduce larger timber, since it had to be inserted into the fourth course through the openings cut from below. All jagged burnt ends were cut to a square face with chisels. After everything was filled up solid a number of five foot bolts were driven up from below, so as to unite both the old and new timber into a compact body. Forty iron straps of 4×¾ iron were also bolted against the roof from below, so as to balance the break of bond in the fourth course. In order to further prevent any undue settling over the line of the fire, the space beneath in the air chamber was built entirely of square blocks of trap rock. carefully laid in cement, in place of the gravel concrete which fills the rest of the chamber. It must be remembered that there are still eleven courses of sound timber above the burnt district. These have abundant capacity to distribute any local deficiency in equal bearing. From the faithful manner in which the work was done it is certain that the burnt district is fully as strong, if not stronger, than the rest of the caisson. The final repairs were concluded March 6, and the air chamber completely filled March 11.

LIGHTING OF CAISSON.

The subject of illuminating a caisson in a satisfactory manner is rather a difficult problem to solve. A powerful light is of prime necessity, to overcome the want of all reflecting surfaces, to penetrate the thick mists usually occupying such places, and to illuminate every foot of a soil which was anything but uniform in character. The burning of candles is attended with an intolerable amount of smoke, resulting from a rapid but incomplete combustion. This nuisance was overcome somewhat by reducing the size of the wick and of the candle, and by mixing alum with the tallow and also steeping the wick in vinegar. The inhaling of so much floating carbon is very injurious to the lungs, as the lamp-black remains in them for weeks and months. Nevertheless, candles have to be used more or less for all special work requiring illumination close by. Lamps are of little account, since they smoke more than candles, and the oil is dangerous in case of fire. Fortunately, the existence of an establishment in New York for the production of oxygen gas in large quantities and at moderate prices made the introduction of calcium lights quite feasible. For a time cylinders, filled with compressed oxygen gas and compressed coal gas, were lowered into the caisson and there used. The danger, however, of breaking a freshly charged cylinder was too great, on account of the risk of an explosion. A double system of pipes was therefore put in the air chamber, one for oxygen and the other for coal gas, which takes the place of pure hydrogen. In the end of each chamber was one burner, and a special one next the water shafts, making 14 calcium lights in all. In addition, there were 60 burners for common street gas, which was used whenever the supply of oxygen failed. The two gas mains passed to the outside of the caisson, where they connected with two tanks. In order to make the system effective, it was necessary to have the gas pressure always one pound or thereabout in excess of the air pressure in the caisson, and also to maintain this as the caisson sank. For this purpose the two gas tanks were filled with water from an artificial reservoir having a head always slightly in excess of the caisson pressure. Into these tanks the gases were discharged from smaller cylinders under a pressure of 225 pounds. The immediate effect was to force the water from them back into the reservoir until the tank was full, when the supply was stopped. The pipes leading to the caisson remained open, and the gas passed through them under the pressure due to the artificial head of water. By means of glass gauges the contents of the tanks could be watched and replenished as often as necessary. As the caisson sank, the reservoir was raised from time to time. This is rather troublesome, and is avoided in the New York caisson by placing the gas tank below in the air chamber, otherwise a tower of eighty feet in height would have to be built by degrees. The gases could, of course, have been pumped directly into the tanks, were it not that the stroke of the pump creates an unpleasant jumping of the flame. The oxygen gas was delivered in a compressed state, and the coal gas was compressed on the spot. When the oxygen was of good quality, two calcium lights were sufficient for one chamber, 102 feet long by 30 feet wide. The heat produced is less than that of a gas flame and the product of combustion water. One attendant was sufficient for fourteen lights, beside all the gas lights. The lime-ball requires occasional turning, as it wears away by the action of the flame, and also requires frequent renewal when water condenses in the pipes. The blow-pipe burners are apt to burn out and get out of order. The explosive flame will also run back and melt the rubber connection. In short, quite an apprenticeship is necessary to adapt the calcium lights to all the new conditions. The only danger lies in the leakage of pipes and from carelessness in leaving cocks open. One gas explosion took place below sufficient to singe off whiskers and create some alarm. The sense of smell is so blunted that the leakage of coal gas is not easily detected. The ordinary gas lights were found to be the most economical. Their cost is only one-fifth of the calcium light and about one-third of candles. They give all the light that is needed, and can easily be located at all points. They produce, however, an intolerable amount of heat, and vitiate the air even more than candles, although producing but little visible carbon. The gas-burners kept the temperature below at 80° to 85°. As long as the air-pressure was so irregular, all lights required careful attention and regulating. During winter the water-pipes above and the reservoir were kept from freezing by steam-pipes laid alongside. The cost of candles, calcium lights and gas was about $5,000, of which candles cost more than one-half, not including the necessary apparatus, which in one item alone comprised over 40 gas cylinders.

ORGANIZATION OF WORKING FORCE.

Each shift of men worked in the caisson eight hours at a time, the first watch from 6 A. M. to 3 P. M., including one hour for breakfast; the next watch from 3 P. M. to 11 P. M., including one hour for supper; then a special night-gang from 11 P. M. to 6 A. M. The majority of the men took their meals along and remained down the full eight hours without any injury. The two day-shifts alternated from week to week. They consist of one general foreman, six assistant foremen (one for each chamber), and 112 laborers. The special night-gang was composed of one general foreman, with two assistants and forty laborers, making a total force below of three general foremen, fourteen assistants, and 264 laborers. This force was constantly recruited from time to time, and an inspection of the time books shows that 2,500 different men have worked in the caisson. On deck there were double shifts of engineers and firemen to run the excavating engines, and engines for running the dirt-cars, also two gangs for attending to the dumping of the latter. In addition there were the engineers for the air-compressors and stone hoisting engine, blacksmiths, machinists, and gas men, one gang to remove the boulders brought up by the buckets. A carpenter's force of twenty-five men and thirty men for setting masonry. The total daily force amounted in all to 360 men. Under ordinary circumstances it would have been economical to work three full gangs below throughout the twenty-four hours. The work, however, was so severe upon the dredge buckets that the night hours from twelve to six A. M., were devoted to repair, both to the buckets as well as cars, engines and other machinery. The night gang usually devoted themselves to getting out boulders where only a few men could work, or they would run one shaft alone or be digging out the other one. Two shanties were put up provided with duly numbered hooks and pegs for the men's clothes, most of which were left above, the temperature below being too warm. Rubber boots were furnished by the company at cost price. In front of the houses are sets of wash troughs with hot and cold water. As each air lock held thirty men, two sets of lockings were required to let down 120. The old gang remained until relieved by the new. No trouble was experienced in getting all the labor required; when one man left a dozen were ready to take his place. New York, in fact, is the best labor market in the country. There was one small strike at the beginning, but it amounted to nothing. The wages paid at first were $2 per day for eight hours' work. After the caisson had reached the depth of twenty-eight feet the rate was increased to $2 25 for eight hours work, and remained at that up to the end. The earlier stages of the work were in reality far more disagreeable than at the end, on account of the constant fog and influx of water, whereas in the latter stages the work was dry.

EFFECT OF COMPRESSED AIR AND OTHER CAUSES UPON HEALTH.

The depth reached by this caisson was not sufficient to produce such fatal cases of paralysis as attended the sinking of the deeper caissons at St. Louis. Only six men were temporarily paralyzed, and in each case upon their first visit, and after remaining but a short period of time. None of the old hands were affected to any extent, even when remaining down eight hours. Since the symptoms can be felt coming on for some time previous, it is an easy matter to get out in time. Inasmuch as the medical profession are as yet somewhat undecided in their explanations of the real cause of paralysis in compressed air, it is proposed, in the deeper New York caisson, to follow out the course pointed out by Captain EADS, of shortening the hours of labor from time to time, as the case may demand it, and thus reduce the period that the human system is in contact with the exciting cause. It is not probable that paralysis is due to the direct pressure of compressed air, otherwise all men would be immediately affected alike, without exception, as all parts of the body must be absolutely permeable. The cause must rather be sought for in the fact that with each breath a quantity of oxygen is inhaled from two to three times greater than that inhaled in a normal atmosphere. That the system struggles against this abnormal state of affairs, is shown by the fact that the number of inhalations per minute is involuntarily reduced from 30 to 50 per cent. It follows, therefore, that the shorter the period of exposure to compressed air, the less the risk. On the other hand, persons affected immediately upon entering, are usually somewhat nervous and excited, which incites excessive action of the heart, and thus accelerates the general tendency to paralysis. Violent exertion, such as climbing of ladders and hard work, must be avoided. The only other inconvenience experienced in caisson work is in the temporary effect on the ears in passing through the air-lock. A short practice, however, soon enlarges the eustachian tubes, so that by setting the jaws at a certain angle, no effect whatever is felt on the ear-drum. As the weather became colder, the men became subject to cold and congestion of the lungs, while undergoing the severe change of the temperature from eighty degrees to forty degrees, which attends a passage out of the air-lock. A simple and effective remedy was provided for this, by putting in a steam coil composed of six rings of one-inch pipe, lining the inside of the lock, and provided with an outlet pipe. As soon as the outlet air-cocks were opened, steam was allowed to flow through the coil with the most satisfactory results. No reduction whatever of temperature took place, neither was there any formation of the disagreeable mist which otherwise attends a reduction of pressure. Another sanitary measure, rendered necessary by

the presence of so large a number of men in a confined space, was the provision of a water-closet so arranged as to discharge its contents out into the open air. That some care had to be exercised in its use, will be self-evident to caisson men.

MASONRY.

Eleven courses of masonry were laid, averaging from twenty-four to twenty-five inches high. Each course contained from 700 to 830 cubic yards, and the size of the stone varied from 30 to 100 cubic feet. The masonry of the first seven courses was composed of rough block, all bedded to a uniform rise. The blocks were all rectangular in shape, with the vertical faces trimmed down so as not to exceed joints four inches wide when laid in the wall. The Kingston limestone was used alone for these courses. They were set in heavy beds of cement, and all the spaces filled in with cement or with concrete, when the spaces were large enough to admit of the latter. As the low water line was approached, granite was substituted on the face in place of limestone, the latter being continued for backing. Where the backing is all cut and composed of large blocks, such masonry can be laid quite rapidly. One whole course has been laid per week, notwithstanding the drawbacks caused by the mud and water from the dredges, and at no time was the masonry behind the excavation in point of progress. On the 10th of December the level of the masonry had arrived at ordinary high water level, and was then suspended for the season by the severity of the weather. The granite was furnished by BODWELL & WEBSTER, from the island quarries in Penobscot Bay, on the coast of Maine. When the regular masonry was laid off, it was found that the caisson had moved one foot toward the river and nine inches toward the ferry. The stone-setting machinery consisted of three boom derricks, standing on the masonry, with masts fifty-five feet high and thirty-five feet horizontal booms. They controlled all points of the stonework. The guys were secured outside, and had to be regulated from time to time. In the New York caisson the derrick guys will be fastened directly to the caisson itself. The same derricks will be used to carry up the tower masonry for about fifty feet, when they will be replaced by balance derricks. The stones were raised by two engines, each working three drums, controlled by friction gearing. They have given perfect satisfaction, the stones being handled with ease and rapidity, and under complete control in setting.

DOCK.

During the winter months the substantial dock resting on top of the caisson on the river side was completed, filled in, and provided with a track, turn-tables, and unloading derrick. On the land side the excavation has been filled in level up to the masonry. When the caisson proper had been filled in, the locks were removed, the water-shaft filled, and the sections above the timber taken out. Next, the coffer-dams inside the masonry well-holes were removed and the mud dug out. No water leaked through the masonry, but considerable fresh spring water oozed up through the timber foundation, that was easily kept in check by pumps. These well-holes were filled with concrete for a height of 25 feet, requiring 550 cubic yards. For the remainder of the distance up to the floor line these well-holes remain open, so as to save masonry. Contracts have been made by the General Superintendent, Mr. WM. C. KINGSLEY, for 20,000 yards of Maine granite, sufficient to carry the masonry of the Brooklyn tower to the level of the roadway. Some delay is, however, occasioned in its delivery, on account of the great demand for granite by the New York and Boston Post Offices and buildings, etc.

THE NEW YORK FOUNDATION.

The foundation of the New York tower is located at the end of Pier 29, at a distance of 400 feet beyond the bulkhead line. A front of 235 on the pier line is taken up by the foundation itself and the enclosure of sheet-piling. The position of the tower was such as to occupy the two ferry slips of the Williamsburgh Ferry Company between Piers 29 and 30. These slips had to be vacated before any work could be done on the foundation itself. In July, 1870, negotiations were begun for the purchase of the site for the removal of the ferry to an adjoining slip, and also for the removal of a neighboring dumping ground, which would be occupied by the ferry. Final possession was obtained in April of the present year. The construction of the new ferry slips is now progressing rapidly, and will probably be completed in July. In the meantime 100 feet of the end of Pier 29 has been removed, and the work of dredging a level bottom for the reception of the caisson commenced. As soon as the ferries are vacated, a pile bridge will be built connecting the foundation with the shore and covering a space of 400 feet in length and 80 feet in width. It will serve as a platform for a storage of the material and machinery required during the sinking of the caisson. This platform is in itself a work of some magnitude, requiring nearly 2,000 piles in its construction, all of which have to be driven in deep water. The river bed is being dredged to a uniform level of 37 feet below high water. It has a slope of 10 feet in the width of the foundation, and consists principally of black dock mud overlying the sand, and covered with sunken timber cribs filled with stone. The quantity to be removed amounts to 5,000 yards.

BORINGS.

Borings were made last year from the end of Pier 29 on the site of the foundation, extending, however, over only one-third of the area. They struck gneiss rock at a depth of 80 to 82 feet below high water, a much more gratifying result than that derived from the first bore hole which was made at a point 400 feet from the foundation, and struck bed rock at a depth of 107 feet and 6 inches. Those holes, however, extended only over a limited portion of the foundation, and a more irregular bottom is to be expected over the remainder. From the success, however, with which blasting was carried on in the Brooklyn caisson, it is anticipated that the rock-bed can be levelled off without much difficulty, in case it should be found necessary. The material encountered in the borings consisted principally of strata of fine sand, coarse gravel, and two large beds of quicksand—one of twelve feet and the other of four feet, the latter lying immediately over the rock. A number of boulders were encountered by the boring tool, one being over three feet in diameter. They were, however, imbedded in loose sand in place of compact clay, as on the Brooklyn shore, and can be easily removed by the same means employed before. The bulk of the sand is fine enough to admit of its removal by sand pumps.

NEW YORK CAISSON.

The plans for this caisson were perfected in the summer of 1870. A contract for its construction was made in October with Messrs. WEBB & BELL the builders of the first caisson, the iron work being done by JOHN ROACH & SON, of the Morgan Iron Works. It was built at the foot of Sixth street, New York, the old yard in Greenpoint, having been abandoned for ship-building purposes. A rather severe winter, with delays on part of the iron work, prolonged the completion of it to the 8th of May, on which day it was launched with the same success attending the first launch. It is now lying in the Atlantic Basin, where seven additional courses of timber and concrete are being put on preparatory to its removal to its permanent site. In its

CONSTRUCTION

this caisson is in its general features a duplicate of the Brooklyn caisson. It is built of yellow pine timber, the air-chamber being lined with a thin skin of boiler plate on the inside. The roof consists of five courses of yellow pine sticks twelve inches square; the inclined sides surrounding the air-chamber are also of yellow pine, and are nine and a half feet high on top, and taper to a rounded cutting edge of cast iron, eight inches wide and enveloped by an armor of boiler plate. The timbers in all the courses are scarphed and bolted together with screw-bolts and drift-bolts. About 180 tons of bolts were used in the fastenings. The dimensions of the base are 172 by 102 feet covering an aera of 17,544 square feet. Its length is four feet greater than the Brooklyn caisson.

THE AIR-CHAMBER

has a height of nine feet six inches, and is divided into six rooms by means of five main frames. The rooms vary from twenty-five to thirty feet in width by 102 feet long, and are subdivided by lighter secondary frames running through the middle. In addition, there are two heavy cross frames extending through the whole length of the caisson. The amount of bearing surface is eighteen per cent. of the whole base, and will be increased to twenty-five per cent. of the whole base, by reason of the sloping sides, in case the caisson should sink into the soil two feet. The main frames are of solid timber, and four feet wide, composed of two central ties of horizontal timber and two outer rows of posts. They are secured to the roof by long through bolts, extending through the lower three courses of the roof, and are heavily braced sideways. The ends of the frames are secured to the sides of the air-chamber by knees and iron straps. Each frame is pierced by doorways of ample size, to afford communication between the adjoining chambers. The secondary frames are open work, composed of posts and sills, and can be strengthened if the necessity should arise. An

IRON SKIN

lines the inside of the air-chamber. The iron is light boiler plate, of No. 6 guage. A light iron was purposely selected in order to overcome to some extent, by its buckling, the difficulty arising from the expansion and contraction of so large a surface rigidly bolted to an unyielding mass of timber. In addition, a series of expansion joints of angle iron were put in transversely to aid in taking up the contraction. No trouble has been experienced from this source since the launch. All spaces between the skin and the timber have been filled with cement. The skin performs two principal offices: that of making the air-chamber tight; and, secondly, to protect the timber above against fire. It also adds to the strength of the whole structure. Inasmuch as the skin is pierced with six thousand bolts, besides its own rivets and caulking seams, it was expected that the leakage at first would be considerably greater than in a caisson made tight by caulking with oakum. This expectation was more than realized, since four air pumps were required to inflate the caisson sufficiently to enter it, whereas one pump sufficed for the Brooklyn caisson. As soon however, as access was had to the air-chamber, the leaks were easily stopped, being both audible as well as readily accessible, and it is now even tighter than the Brooklyn caisson.

AIR LOCKS.

Two sets of double air locks are provided, each 6½ feet in diameter by 8 feet in height, and capable of containing thirty men; thus enabling the whole working force of one hundred and twenty men to enter at one locking. The locks are built into the roof of the caisson—the lower half projecting four feet into the air-chamber, and the upper half communicating with a rectangular trough seven feet long, which connects each pair of locks. This trough enlarges above into a circular well of boiler plate eight feet six inches in diameter, which is carried up inside the masonry as the caisson sinks. This style of lock presents some advantages, as well as disadvantages, when compared with the old mode. Less time is occupied in passing through a large number of men, and the fatiguing labor of climbing a high vertical iron ladder, within the compressed air, is avoided. On the other hand, the locks are dark; they are liable to be flooded by leakage from the well above, thus cutting off both ingress and egress, and in case of an incursion of the waters from below, the avenue of escape is sooner cut off. Steam coils are provided for maintaining a uniform temperature when coming out of the lock.

EXCAVATION OF MATERIAL.

The removal of the material from the caisson will be effected, as before, by means of open water-shafts and the Cummings' dredges. The shafts, however, in place of being square, are round, having a diameter of seven feet nine inches. The round form is much better adapted to resist a bursting pressure, in case it is necessary to blow the water out of them. Since the water-shafts have to be cut off when the caisson arrives on the rock, they are provided with caps and air-locks of their own, the old Brooklyn locks being used for the purpose. This will give the opportunity of filling the shafts under pressure. In addition, fifty-eight iron pipes, of 3½ and 4 inches diameter, have been distributed throughout the caisson, for the purpose of pumping out any sand that may be fine enough to admit of it. The fact, however, of three bore holes out of four encountering boulders, made it necessary to provide the means used before for their removal.

THE SUPPLY SHAFTS

are four in number, two of 21 inches diameter and two of two feet diameter, disposed symmetrically throughout the caisson, and arranged in the same manner as those used before. They will prove more than sufficient to supply all the concrete that 120 men can dispose of in filling the air-chamber.

THE LIGHTING

will be done by gas principally, although a double set of pipes has been put in for sixteen calcium lights. Sixty double gas burners have been provided, giving ten lights for each chamber. The roof and sides have also been painted white, thus increasing the reflecting surfaces. The management of the gas, however, has been reversed from the Brooklyn arrangement. In one of the chambers below are two gas cylinders, one for oxygen and the other for hydrogen gas, each six feet long and three feet six inches in diameter. The gas pipes in the chamber connect with these tanks. Compresssd gas is forced into them through special pipes leading down from above, and the requisite excess of pressure over the caisson pressure is maintained by a head of water forcing the gas out of the tanks into the pipes. On the dock above, at an elevation of a few feet above the water level, are the two other cylinders, the exact counterpart of those below. They are partly filled with water, which communicates by pipes with the lower tanks, and forces the gas out of the latter. The stage of water in the upper tanks will always indicate the amount of gas in the lower tanks, and, as the caisson sinks, it of course increases the head of water for forcing out the gas in the exact ratio required. The cost of gas is only one-third that of candles, besides giving a much better light and making no smoke.

SEA WORMS.

Particular care has been taken in this caisson to protect the timber from the sea worm on the outside. This protection is only required while the caisson is afloat and while it is being sunk; ultimately, all the timber will be submerged far below the river bed, where the worm never penetrates. The borings, moreover, showed that the layer of gravel occurring 12 feet below the river is permeated with fresh water, which is fatal to the teredo. Every beam on the whole outside of the caisson, and also on top of the sixth roof course, is thoroughly caulked, both with a view to keep out the salt water as well as to aid the air tightness and to relieve the iron skin from any back pressure. In the next place, the same surface is heavily graved with a composition of coal tar, rosin, and hydraulic cement—the latter material having sufficient body and grit to dull the boring apparatus of the teredo. Coal tar alone has but little efficacy, because the animal does not digest the material through which it bores. Over this coating there extends an unbroken sheet of heavy tin, covering the outside and the top of the sixth course. Every seam is soldered air tight, and a layer of tar paper put above and below the tin. On the outside of this is the four-inch yellow pine sheathing of the caisson, which has been kreosoted with ten pounds of oil to the cubic foot. These precautions will not seem superfluous when it is remembered that the sea worm is a microscopic animal, less than the sixteenth of an inch in diameter, and can penetrate any crevice that water can pass through. The course above this is also caulked, and is protected on the outside like the lower courses. We are thus provided with an additional air-tight layer in the caisson, which will come into play in case of accident to the iron skin. The seven courses of timber immediately following the caisson proper are all laid with cement spaces between the timbers; they are surrounded by tarred sills, and the tin and kreosoted sheathing is carried up outside the whole extent. The courses above that will be completely enveloped in concrete.

FLOOR.

The New York caisson was launched with a temporary floor extending over the whole base. This was made necessary by reason of the shallow water in front of the launching ways. The floor will remain until the caisson is permanently grounded on the river bed, and will help materially in maintaining a level position of the same. The air chamber will not be inflated until the caisson has touched bottom, and enough masonry has been laid to prevent its rising at high tide and from the pressure of compressed air. This floor then comes into play to distribute uneven pressures until access is had to the air chamber and the work of excavating has commenced. Respectfully submitted, W. A. ROEBLING, Chief Engineer.

TABLE OF QUANTITIES—NEW YORK CAISSON.

Length over all	172 feet.
Breadth	102 feet.
Height	14 feet 6 inches.
Area of base	17,554 square feet.
Quantity of timber	118,000 cubic feet.
Weight of bolts	180 tons.
Weight of iron work	200 tons.
Launching weight of caisson	3,250 tons.

MINING SUMMARY.

California.

CROCKER'S NEW QUARTZ MILL.

A model of a new and very important invention, says the *Alta*, can be seen in the show window of ROSENCRANS & Co.'s hardware store on Montgomery street, opposite the Occidental Hotel; and a working model of the same—intended for the Mechanics' Fair—at 111 Mission street. The machine is intended for quartz crushing, and although only a small model, can crush one hundred pounds of rock in ten minutes. It has five stamps, striking two thousand blows per minute. Each stamp weighs five pounds, and is three inches in diameter. It is the sharp, quick blow that does the work, with very little power in comparison to the old style of stamps. The first cost of the battery is not one-fourth of the old style machines which do the same amount of work. The difference in freight would be very great to many places in the mountains. This battery, which will crush seven tons per twenty-four hours, weighs about one thousand pounds, frame-work and all, and can be put on a dray and taken anywhere. It has been patented. A battery of five stamps, twice as large, with six-inch stamps, would have about five times the crushing capacity, or thirty-five tons per day. The inventor claims that the expense of running this mill will not be one-half of that in ordinary mills. The invention is of purely California origin, and at least merits examination on the part of those interested in quartz mining.

AMADOR COUNTY.

MINERS' STRIKE.—A mob of strikers, on the 2d, drove out all the miners at work in the Keystone, Amador, Little Amador, Haywards, Poundstones, Douns, and Malonys gold quartz mines, at Sutter creek and Amador, the second most productive mines in California. They demand an advance from two dollars, which they have been receiving for twelve years, to two dollars and a half a day. They have taken possession of all the mines and machines, except the Amador. The owners and officers generally refused to accede to the demand of the strikers, and will call on the State authorities for aid.

NEVADA COUNTY.

We quote from the Grass Valley *Union*:

"TOWN TALK MINE.—We saw yesterday at FINDLEY & Co.'s bank, a fine lot of retorted gold, worth about $5,000, the proceeds of a month's run of the Town Talk gravel mine. The Town Talk has a mill of eight stamps, which are driven by water power, and all the gravel taken out is put through the mill. There are only three owners in the Town Talk, Messrs. M. BYRNE, Sr., JOHN TRENBERTH, and THOMAS WALKER. The profits of the run for this month are over $2,500. The owners of the mine are about putting up a steam engine to run their mill, since want of water in the summer time stops operations. The steam mill will be running by the 20th of June. The Town Talk is on the great gravel range of this section, and is east of the town. The company have a very large extent of ground.

"GEN. GRANT MINE.—The Gen. Grant Mining Company have had a crushing at PERRIN'S mill, and last Saturday a clean up was made. The number of tons crushed was ten, and the yield was $518 50, or $51 80 to the ton. The Grant is the mine located farther south than any other in the Grass Valley district, and it is paying splendidly. All the mines in the northern part are doing well, and between the extreme bounds of the district are rich mines.

"A '49 STRIKE.—We get the following item from the Nevada *Transcript*: On Wednesday last WILLIAM MICHELS and another man made one of the richest discoveries ever made in this State. The strike was made on the Washington road, about five miles from this city, at a point where several old roads come together. The parties were walking along the road and found a lump worth about eight dollars. They immediately went to work and ascertained that the gravel prospected well. On Thursday they went up with MARKER, and on that day panned out $84. Yesterday MARKER'S stage stopped on the down trip, and the eleven passengers picked up from $10 to $12 in dust in an hour. The surface prospects from $10 to $12 to the pan, in coarse gold. The spot where the discovery was made is about one mile south of where the six-mile house formerly stood, where several roads connect the Washington road. The ground has been travelled over for years without suspecting the existence of gold, and now a regular '49 strike has been made. The ground is certainly rich, but whether it continues so or not will be settled soon. Several locations have already been made, and a number of persons went out yesterday afternoon to see the ground. The bed rock is not near the surface at the point where the discovery was made, and the ground is comparatively level. Passengers who came down yesterday substantiate the statements in regard to the rich discovery, and assert that gold could be found as though some one had scattered it like sand upon the surface. It is probable that the ground for miles will be located in a day or two."

PLACER COUNTY.

The Grass Valley *Union*, in an article on the quartz mines of Auburn, says:

BUCKEYE MINE

is located east of the St. Patrick mine. The vein is an east and west one. It is enclosed in talcose slate. There are two shafts sunk on this ledge, and the shafts are 144 feet apart. The company are now running drifts to connect these two shafts. The drift is in sixty-five feet, running to the east. There are three stopes; the first stope is one of fifty-four feet; the second thirty-four feet, and the third is fourteen feet. West of the west shaft a drift is in twelve feet, and east of the east shaft a drift is in forty feet. Along the surface of the ledge, in former times, miners have stoped out 4:0 or 500 feet to a depth of thirty-two feet. The character of the ore is similar to the St. Patrick. The ledge is about fifteen inches in thickness. The ore has paid, by mill process, $25 to $35 per ton, which gives large profits. Some white and "hungry"-looking quartz from this ledge paid $9 per ton. The Buckeye is a promising mine. At present water power is used, but steam power will be put on when necessary. Occasionally fine specimen rock is taken out, as at the St. Patrick. Several veins connect in the Buckeye claims. A San Francisco company own the Buckeye mine.

DILLON MINE,

located four miles north of Auburn, on Rock Creek, has had a crushing lately of thirty-five tons of rock, which paid $79 per ton. Steam-hoisting and pumping works are being erected at this mine. The machinery for the works is from Lakenan's foundry, at Grass Valley.

OTHER LEDGES.

Work is being actively prosecuted on the Mina Rica, Crœsus, Butcher Boy, Spring and Merrow, Putnam, and other ledges. We noticed that ROB CRYER & Co.'s ledge is idle, though paying rock has been taken from it. A visitor to Auburn will soon discover, by specimens of gold-bearing rock exhibited, and by talk about mining, that the district is alive to the principal interest of California.

Nevada.

NYE COUNTY.

The Reese River *Reveille* of May 31st, furnishes good news from Nye county:

"MINING SALE AT BELMONT.—We mentioned a few days since the working of twenty-seven tons of ore from the Monitor mine, near Belmont, which averaged $700 per ton. We learned last evening from Mr. W. FLAGELER, one of the owners, that he had just effected the purchase of 700 feet from two of his partners for $15,000 cash; $12,000 were paid in Belmont, the balance was paid last evening. There are sixteen hundred feet in the claim.

"ORE FROM MONTEZUMA.—Two tons of ore from the Henry mine, in the above district, just worked at the Manhattan mill, yielded $505 per ton. The owners are Messrs. SMITH, BLACK, TANDY, EGLESTON, WARNE, and others of this city. Two lots of half a ton each from the Lee Hope and White Fawn mines, owned by Messrs. CARPENTER and CROSS, also worked at the Manhattan, yielded, the former $458 55 per ton, and the latter $289 04.

A correspondent of the *Elko Independent* writes from the Cape district the following concerning that locality:

Business is extremely dull here notwithstanding the mines are looking better than they have done since the discovery of the district. The old mines are improving, and new ones—as they are prospected—bid fair to eclipse any yet worked. The El Dorado has a ledge 4½ feet wide and *all mineral*, and that mineral as taken from the ledge, mills $225 per ton. The Independent mine is working only eight men, as they have no opportunity at present to have their ore worked. The ore in this mine is quite rich but requires roasting. DAVIS' mill is the only ore here with furnaces, but is almost useless at present, on account of the crushing apparatus being almost worthless. That, however, will soon be remedied, the mill having changed hands and the present owners intend putting in stamps immediately. The Pride of the West mine, owned by the HENDY Co., from the present appearances bids fair to turn out as well as Sam's best friends could wish and that's pretty good. The incline is down sixty feet, and shows not only rich rock and plenty of it, but what is still better, it shows every evidence of being permanent. About fifteen or twenty men are "chloriding" across the river from town, and from appearances are doing well, making from four to nine dollars a day. For amusements we fare about as well as other mining camps—Sabbath school and dog fights on Sunday, and poker and whisky the rest of the time. No sales of mines have been effected lately.

EUREKA DISTRICT.

According to the *Eureka Sentinel*, the assessment roll shows that for the quarter ending April 31st, there were worked in this district 3,020 tons and 1,283 pounds of ore, which gave a result of $270,629-06 in value. This is for the most unpleasant quarter of the year, although it shows a large amount of money, as there were, at that time, on the dumps more than double the ore that was worked. The great difficulty, and from which there is much complaint, is, in the fact that the companies, without exception, have mines that will produce ore to an extent sufficient to keep their furnaces running without purchasing from outside parties. We need half a dozen furnaces that will buy ores and pay a fair price for them. Then there would be more inducement for miners to work on their claims, and more certainty that the prospecting would increase.

Montana.

From the *Montanian* of the 11th we clip the following:

"Mr. TOOMBS is running a hydraulic on the bar at the mouth of the Magpie; but as he had not cleaned up we did not ascertain what the pay was. The prospect, however, was supposed to be favorable. White's gulch presented quite an animated aspect, in contrast with previous years, when but a small sluice-head of water ran in the gulch. Now several hydraulics are playing on the bars, and the miners are "rushing" it, intending to make all the use possible of the season's water before cleaning up, and we have no doubt the result will be satisfactory. FRANK SLOAN, who has been so long in the gulch, still resides there, and is energetic in the cause. There are very few idle men now at Diamond, and the town presents a more cleanly and orderly appearance than it formerly did. The miners in the gulch have been compelled to suspend work for a time, owing to an over-abundance of water in the drain-ditches and on the bed-rock, and cannot resume for at least a month. There are several bars and side gulches that will pay good wages for several years. Spruce bar and gulch are among them. MACGREGOR & Co. are running their hydraulic in Montana gulch, night and day, with good prospects and fair returns. KING & GILLETTE'S bed-rock flume is running full of boulders, gravel, and earth, from their great ground sluice on Confederate. This season affords them all the water they need."

According to the same source the Superintendent of the Everett-Green Campbell Mining Company, Mr. JOHNS, was in the city for several days the past week. Mr. JOHNS reports the mill moving night and day, the quartz in the ledge narrowing some little, but improving in richness. Mr. JOHNS brought in with him for shipment east, thirty pounds of gold retort, it being the last month's run from his company's mill. To see such sacks of gold is very encouraging to quartz men, and gives us all hope.

DEER LODGE COUNTY.

The Helena *Gazette*, of May 22d, has the following mining items: Reports from Cable City yesterday say business is very dull. Some quartz is being taken from the upper levels in the Cameron mine, and the running of the lower level is pushed with all possible dispatch. PEMBERTON & Co. cleaned up from their claim near Pioneer City $2160, the result of one week's run.

MEAGHER COUNTY.

Recently we visited nearly every camp in Meagher county, and can speak from our own observations of the prospects. On Trout creek, the Welch pump had got out of order for a few days, but was pumping away on the 12th, and the opinion of those entitled to the most intelligent views of the mining prospects of the creek, was that good pay will be the result of the long protracted labors to develope the wide and deep bed of Trout creek. In New York and Kingsbury gulches is still produced a fair equivalent of dust in return for the hard work of the miners, and Oregon gulch has the usual number of men—ten, some of whom had at one time sold out and left the country for good, but again returned and bought into claims to make another raise to replace the money spent in the "States." The upper portion of Cave gulch exhibits more vitality this year than it has for two years previous, and the miners are doing very well. There is more water this year in New York, Oregon and Cave gulches than there has been in any three previous years. At the villages on lower Cave and the foothills, we observed more signs of life than we have witnessed since 1867. Hornbuckle's ditch had but 25 inches of water but it was increasing, and by the first of June will be full. The other ditches, in which Capt. STAFFORD, the Clems, Warner and perhaps others are interested, were all full and the the water was diffused over most of the camps and all in use.

MISSOULA ITEMS.

We glean the following from the *Pioneer* of the 18th: The Missoula water-works will be completed by the first of June.—The Hellgate and Bitter Root rivers have risen at the rate of from eight to twelve inches per day for the past week.—Good pay has been found on No. 84 on Cedar creek, which has created considerable excitement.—The Rabbit creek, a tributary of Cedar, is turning out rich. The gold is coarse, and a nugget of the value of $33 was found there last week.

QUARTZ CREEK.

A gentleman just arrived from this camp informs the Missoula *Pioneer*, of May 18th, that the most sanguine belief is entertained there that mining claims will yield very rich returns this summer. In the upper and lower districts 200 claims are now being worked with the most encouraging results. The claims on the bar are all steadily paying from $1 to $1 50 to the pan. The only drawback to increased development is the superabundance of water, but side-ditches have so far prevented any serious inconvenience from this cause. Business is daily improving throughout the camp, new stores are being opened, and the merchants have every confidence in profitable returns upon the merchandise they are now bringing into camp from all quarters. Our informant states that there is not an idle man in the gulch, and that the demand for labor will be greatly increased when the opening of the deep ground is fairly commenced. So far the miners have confined themselves to shallow ground, but as soon as the water falls deep-ground operations will be inaugurated in earnest, and a very large yield of the precious metal is then expected.

From the *Herald* of the 15th we learn that Mr. J. C. RICKER'S mill (the I. X. L.) will start up again in a day or two, and it is his intention to keep it running during the entire season. Three hundred tons of ore are already mined and on the dump, and a force of men still employed.—YOUNG & MCDANIEL, after a run of thirty hours on Golden Bar, at the head of Grizzly gulch, made a clean-up Saturday night of 12½ ounces, or about $220 in gold dust.

Colorado.

From the Colorado *Miner* of Georgetown, we clip the following copious mining news:

The Slide lode, on Leavenworth mountain, is yielding some magnificent ore, not unlike, in appearance, the ore from the celebrated O. K. lode, and probably quite as rich. The Baker S. M. Co. shipped last week one bar of silver bullion weighing 658 oz, ·788 fine, coin value $670 37. The bullion was obtained from ore from the Stevens mine, treated at the Baker mill. We learn that the Stevens lode, in Argentine, is looking unusually well. We are informed that in sinking the last five feet of the shaft, four tons of first-class ore were obtained. The shipping ore from this lode is a fine galena, very rich in silver, averaging 175 ounces per ton.

We are informed that work will shortly be commenced on the August lode. This vein is an old discovery, and contains a large amount of ore of a fair grade. It is estimated that the vein contains eight inches of ore that carries $100 per ton. We are told that it is the intention of the owners of this lode to cut it by a tunnel, which being 220 feet long, will cut the vein to a depth of 300 feet. The Maine lode, the vein lately discovered by CHAS. KENNEDY, on Republican mountain, is now yielding some magnificent ore. The vein has a large crevice, and contains two veins of pay ore, one of two and the other of six inches in thickness. The ore is much decomposed and oxidized, and is very rich, assays away up in the hundreds being common. The ore that remains in its original state seems to be galena and sulphurets, with little or no zinc blende. The Palmer & Nichols Reduction Works are kept fully employed treating silver ores. During the past week they have been delayed two days by the breaking of a screw conveyer, used in the crushing department of the mill. This, combined with the fact that they have been treating a quantity of very low grade ore, causes the bullion report to be somewhat low. The firm has purchased a number of lots of ore during the week; we note three lots from the Equator slide, assaying 205, 531 and 593 ozs.; also a lot from the Hise, assaying 196 oz. While in the mill we noticed a lot of O. K. ore that is awaiting treatment. Ore from the Mammoth and Bullion loder, of good quality, will soon be reduced. The buillion report of the firm for the week is as follows: one bar 1,024 ounces, ·958 fine, coin value $1,268 33; one bar 908.8 ounces, ·951 fine, coin value $1,117 58; one bar 432.55 ounces, ·981 fine, coin value $548 65. Total, $2,934 56.

This is the finest lot of bullion ever produced in Georgetown, as it is over .950 fine, and it clearly shows that the Bruckner cylinders, when properly used, can produce nearly as fine silver as is usually produced where silver is obtained by smelting and cupellation. All the bars above noted are over coin standard, and one of them lacks but very little of being 1000 fine. The Stewart Silver Reducing Company shipped last week silver bullion to the amount of $4,332 18, coin. The Baker mill commenced treating ore from the Baker mine on Tuesday last. We are informed that the mine is in good ore at various points. Work has been resumed on the Equator No. 2 lode, on Leavenworth mountain. A new shaft is being sunk about fifty feet to the east of the discovery shaft. The vein is looking well. The work of connecting the Terrible tunnel with the shaft on the vein will soon commence. The Burleigh drill will be used. The lode where cut by the tunnel is looking well and is yielding considerable ore. The Eclipse Tunnel, Griffith mountain, on Saturday last had reached a distance of 325 feet, with indications of being in close proximity to a mineral bearing vein. Numerous feeders, carrying mineral, have been cut in a few feet. Work has recommenced on the Ocean Wave lode, Leavenworth mountain, the owner of the mine, Mr. CHARLES UTTER, having leased it to THOMAS PLICE. A shaft is now being sunk at the point of junction of the two lodes, and a vein of ore fully one foot in thickness has been found. At the Monticello Tunnel a shaft is being raised to the surface for ventilating purposes. Mining affairs in Empire are beginning to present a rather lively appearance. A number of parties are sluicing in upper Empire. Messrs. SHEATON, GUIBOR and OSBORN are running a sluice in the east branch of Lyon gulch, on Silver mountain. They have but just commenced operations, and will doubtlessly make "a good thing" of it. Messrs. GUIBOR and the HARRINGTON BROS. are also sluicing in the same gulch, near the Rosecranz lode, with highly encouraging prospects. MERRILL & MCCORKENDALE are also sluicing on Silver mountain, near the Ben Franklin lode. Their ground is prospecting well. In the way of lode-mining, we learn that JAMES PECK, Jr., is working on the Has-

kins, Gem and Rosecranz lodes. Mr. JAMES COALEY is working the Pioneer lode, and has just struck a fine vein of iron. He has hitherto been raising surface quartz, which is apparently very rich. Mes. HODGKINSON & HASKINS are working on the California lode, and are mining some fine surface quartz. They are also preparing their arastras, and will soon be engaged in treating the ore they have already out.

ALBRO LODE.—We paid a short visit to Mill City last week, and while there dropped in at the mill of Colonel SAYER. The mill has been lying idle for some time, but is now being thoroughly overhauled and fitted up for working. The mill contains twelve stamps, consisting of three four-stamp batteries. After passing over the tables, the crushed ore is led by a trough into a concentrator, where the sulphurets of iron and copper are separated from the sands. This concentrator, which was erected by J. L. WILSON, is a continuously-working machine, and, judging from the quality of the work done, there is no doubt but that it is capable of doing what is claimed for it. The machine is not unlike the Rittinger's continuously-working Stossheerd, being a table over which the ore and water are passed, and in the passage being subjected to a number of shocks or vibrations from a cam. It is the intention of Colonel SAYER to work his concentrated ores in pans, three of which are already in place and will soon be running. The ores to be worked in this mill are those from the Albro lode, Morris district, one of the largest veins in that section of the country, and a vein that is furnishing a large amount of ore. The mill has a capacity of one cord per day, and the concentrations will probably amount to one ton per day. Power is obtained from a large turbine wheel, the supply of water being constantly sufficient. The Albro lode is opened to a depth of 200 feet, and we were informed that a tunnel is now being run to cut the lode at a depth of 500 feet. This being done, the vein will be placed in a shape for the cheap extraction of the ore. The ore from the Albro, mainly iron and copper pyrites intermixed with gangue, is of fair quality, the surface ore yielding five ounces per cord under stamp-mill treatment. Assays show that the solid mineral is of high grade, $200 per ton having been obtained by the recent tests. The lode has a crevice of three feet in width, all of which is being raised to the surface, and all of which will be passed through the mill. The Washington mill is now engaged concentrating ore from the Brown and Terrible mines, a large lot of which is on hand awaiting treatment. We noticed a lot of ore from the Terrible tunnel which was filled with mineral. While at the mill we inspected the sample-room, where we found eleven bins for the reception of crushed ore. The mill is now prepared to accommodate our miners, and is a good place to which to take ores for crushing, concentrating and sampling. We learn that a lot of ore from the Stevens lode will soon be taken to these works for crushing, sampling and sacking.

Mining matters in Cascade district are flourishing. About fifteen men are at work in the district, the larger part of whom have been at work there during the winter. We learn that the Alps lode, being worked by Mr. Thorn, carries a pay vein of over 2½ feet of solid ore, which will mill over one hundred ounces in silver per ton. The Cynosure lode, in this district, is presenting a fine appearance and is yielding some unusually high-toned ore. The Charter Oak is also turning out mineral, ten tons of which will soon be packed over to Georgetown for treatment. The great want of Cascade district is milling facilities. What ore is brought from there has to stand a charge of $12 per ton for packing. If there was a good mill near Idaho, provided with say two Bruckner cylinders, there is no doubt but that Cascade district and that vicinity would receive a great impetus. The mines that would supply such a mill with amalgamating ore are both numerous and rich, and they should not be permitted to remain unworked.

Idaho.

OWYHEE ITEMS.

We clip the following from the *Avalanche:* WELLS, FARGO & Co. shipped below, this week, fifteen bars of bullion, valued at $14,889 14. Golden Chariot stock was quoted in San Francisco, last Saturday, at $41; Ida Elmore, $16½; Legal Tenders, 90½c. to 91c. S. O. HUGHES & Co. have commenced placer mining in Long gulch. It is currently reported that the Golden Chariot Company are making arrangements to move the Rising Star Mill from Flint to this place. Mr. PECK is sluicing the dump at the Bella Peck mine. Chariot receipts for April were $42,454 95. PUT BRADFORD'S 10-stamp water-mill on Sinker creek is running on Surplus Oro Fino ore. The machinery is driven by a 20-inch double Turbine wheel, and works in the most satisfactory manner. We noticed about 1,000 pounds of Golden Chariot amalgam at the War Eagle mill last Wednesday. NED KENNELLY cannot be beat for turning out bullion. The mill will run on ore from various mines till the first of June, and then commence on Peck & Porter. There is a large pile of good-looking ore on the Oro Fino yard, which will be worked at the Webfoot mill. The engine-bed at the Chariot has been taken up and put down again in a substantial manner this week. A new yard, on which to sort ore, is being fitted up underneath the Chariot tramway. CHARLEY HAYER & Co. are working the Daniel Webster mine, and have now about sixteen tons of ore ready for crushing. The shaft is down twenty feet, showing a rich gold-bearing vein from five to six inches in width. CHARLEY discovered a new ledge, eighteen inches wide, a short distance south of Fairview, last Wednesday. Superintendent MINEAR has commenced sinking a shaft on the 200-feet of Mahogany ground, joining the south line of the Peck and Porter, and which is not claimed by BEN COOK & Co. MICKEY & Co. are working the Empire, taking out good-looking silver ore. The Skookum boys have erected a whim on their mine and are working night and day. The shaft is down 160 feet. The ore, of which they have out about 150 tons, is being worked at their own arrastrar. The MCMAHON Bros. have on hand fifty tons of Red Mountain ore, which will be worked immediately at the War Eagle mill. The upper shaft is down seventy-five feet, where the ledge is from two to two and a-half feet in width. The Red Mountain will pan out handsomely this season. SANDS & Co. have about fifty tons of splendid-looking ore on the dump at the Illinois Central. The shaft is down seventy-five feet, from the bottom of which a drift has been run south fifty feet, where the vein is twenty inches wide, and rich in both gold and silver. A company of tributors have commenced work on the Poorman. Mr. PECK has commenced work on his new mine in Webfoot gulch, the Udolo & Tallula Peck, with a good prospect of developing something rich. Work has been commenced on the Antarctic mine, situated on Long gulch, at the foot of Clinton street, where the welcome boom of blasting greets our ears at all times of the day. The parties at work on the various mining dumps are all doing well. O. H. PURDY has turned "honest miner," and is busily engaged in his placer claim, below the Ida Elmore hoisting works. The Sullivan boys, of Jacob's gulch, got the water into their ditch lately. Considerable prospecting is going on, and quite a large number of new locations have been recently recorded.

A letter from Warren's Diggings informs the *Idaho Statesman*, of May 25th, that there is every prospect of a lively mining season there this summer, and of a larger gold yield than any year since 1864. The mountains are full of snow, giving promise of an abundant supply of water, and the miners are fully prepared to take advantage of it. Many gravel banks, heretofore untouched, will be reduced this summer. Old Florence, also, will have a new impetus of life this summer, but the Chinamen are the principal owners of this camp.

Arizona.

The Prescott *Miner* is very jubilant over the prospects of the mines in the vicinity of that town. We extract the following from its columns:

BRADSHAW DISTRICT.

It is but little over a year since the first rich gold ledges were found and located, in Bradshaw mountain, and not six months since the Tiger, the first, best and richest silver ledge in America, was found and located, and, until the past two months, all the work performed in the entire district would not have tired a score of men, in a week. What a change! To-day, there are numerous shafts, cuts, and tunnels, displaying ledges of great width, richness and beauty; scores of tents, cabins and houses; and at least 300 men—all strong in the faith that the wealth of their district is all that could be desired. Mills, furnaces, and other appliances, for extracting the metals from the ores, will soon be erected, and a town larger than Gold Hill, or Virginia City, will spring into existence. Even now one smelting furnace is in full operation, and a small mill will soon be erected. Not a week passes that new discoveries are not made, and every foot sunk upon the Tiger, Eclipse, Cougar, Badger, Lion, Del Pasco, Hunter and other ledges, brings to view more rich ore, thus proving that the veins are true, permanent ones. The miners of Bradshaw, must, however, sink deep in their mines before they can expect to realize fortunes from them, they must act liberally with capitalists who will be here to proffer assistance, and make money by using money; and the same applies with equal force to miners in other districts. Far removed, as Arizona is from the centres of capital and the marts of trade, and feared as she is on account of her Indian incubus, it is not a very easy task to induce capitalists to invest in her mines, and they would not do so at all but for their great richness, and the fact that wood, water and grass are here in abundance, and that the climate of Central and Northern Arizona is the best in the world. Where there is abundance of ore that will pay from $20 to $1,000 per ton, there need be no fear but that, sooner or later, it will be worked, and all know that rock from several ledges in Bradshaw, have yielded far beyond these figures.

WALKER DISTRICT.

The first ever organized in Central Arizona, is keeping up its old and brilliant reputation. It is scarcely ten days since Mr. POINTER brought to town about $1,400, the proceeds of 25 tons of ore from the Pointer lode, which he had just worked in an arrastra. Then, on Saturday last, C. Y. SHELTON, another indomitable WALKER man, brought down $840 in dust, and about $200 in specimens, which he had just taken from 2,500 pounds of VERNON ore. We spent nearly an hour in looking through his sack of specimens, and although much fine gold had been shaken out of them, on the trip down, they were yet the richest specimens ever seen in this town, and the ore containing the gold, is extremely beautiful, it being of a white and red honey-comb structure. Really, SHELTON'S Vernon lode is the best poor man's lode we know of in this or any other country, it having been tested in various places, to a depth exceeding 40 feet, and found rich in all of them. He has tunnelled upon the ledge a distance of 165 feet; and has now a two feet vein, in which the gold can be seen by the light of a candle. He thinks some of buying and starting the Eureka mill, or of getting an entirely new mill. He does not care to sell, as he is now able to work his ledge, and get all the money he cares to have. The Pointer lode is not far behind the Vernon, and there are many others in the district nearly, if not quite as good as the Pointer. The Thunderbolt mill is running, to what purpose we are not advised. Placer miners making fair wages.

HASSAYAMPA DISTRICT.

DAVIS & COMPANY are working upon their fine lode, which is one of the largest and richest in the Territory. Philip Richardson, the latest arrival from the mine, and a gentleman of considerable experience in mining matters, has been pleased to inform us that when he left there, a few days ago, the vein was twelve feet thick, every inch of which contained plenty of silver and gold. The croppings of this fine vein have been traced and prospected for a distance of 4,000 feet, and free gold and silver found everywhere, so that it appears to be to the Hassayampa what the Tiger is to Bradshaw—the great mother vein.

WEAVER DISTRICT.

The owners of the Great Sexton mine, in Weaver district, do not care to have the great richness and immensity of their mine talked about publicly, but we cannot resist the temptation of "blowing" upon them, and assert, upon the word of intelligent, reliable gentlemen, that the ore is very rich, and that there is enough ore in sight on the surface, to give twenty years' employment to a dozen twenty stamp-mills. In the same district, near Rich Hill, where, in 1862, '63 and 64, hundreds of pieces of gold, large as hen's eggs, and thousands of smaller pieces were picked up, DAVIS and others are at work on what is said to be a rich ledge.

WICKENBURG DISTRICT.

Mill running and paying. Deep shaft on Vulture lode down over 350 feet, at which depth there is abundance of rich ore.

BIG BUG DISTRICT.

Mr. GRAY was in town during the early part of this week, and said matters looked pleasing when he left. The mill was pounding away.

OTHER DISTRICTS.

JENNINGS & Co., are working on the "Miner's Delight," a free gold ledge, near the Government saw-mill, between Prescott and Camp Verde. Prospect flattering. We have no news from Wallapai District, Mohave county, or from Yuma, Pima and Maricopa counties, in all of which there are very rich gold, silver, copper and lead mines. We will close, by informing prospectors that there are rich mines in Black Cañon District, all around the military post recently established by General STONEMAN, and that they had better pay that section a visit. Then, the Pinal country, and that around Phœnix, Salt River, offer tempting inducements.

New Mexico.

ELIZABETHTOWN.—The *Argus* has the following items: Three houses shipped, the past week, $2,805 65, gold. This from various claims. Aztec Mills cleaned up over 150 oz. for the past week. The actual mill expenses were less than $600. MATT. LYNCH cleaned up 37 oz. 8 pwts. gold, in one week's run, on the Pollock claim, for the week ending April 20; and for the week ending May 6, 56 oz. 12 pwts.

Wyoming.

The Wyoming *Tribune* of May 27 says that near Aspen, on the Union Pacific, there have been discovered some of the richest silver leads yet known. Claims have been taken, and a company is now being formed, known as the Aspen Mining Company and Smelting Works, with a capital stock of $75,000.

Utah.

We copy from the Salt Lake *Tribune*, of May 27th, the following items:

ASSAYS OF UTAH ORES.

SOL LEVY, successor to MOLITOR & Co., has kindly furnished us with the following assays:

STOCKTON DISTRICT.—No. 1, $72 26 silver, 54 per cent. lead; No. 2, $37 70 silver. 61¾ per cent. lead; No. 3, $34 56 silver, 48¾ per cent. lead.

EAST CANYON DISTRICT.—No. 1, 168.88 oz. silver, $218 34; No. 2, 738 38 oz. silver, $941 69; No. 3, 1,419.12 oz. silver, $1,834 78.

COTTONWOOD DISTRICT.—No. 1, 36.45 oz. silver, $47 13; No. 2, 134.25 oz. silver, $173 57, and 72¾ per cent. lead; No. 3, 53.46 oz. silver, $69 12, and 35 per cent. lead; No. 4,243.30 oz. silver, $315 14, and 67½ per cent. lead.

CAMP FLOYD DISTRICT.—No. 1, 177. 99 oz. silver, $230 12; No. 2, $47 95 oz. silver, $62 04.

WEEKLY REPORTS OF ORES SAMPLED AND SHIPPED.

SALT LAKE CITY, May 20, 1871.—The following is the report of our weekly receipts of ore, which you will find has fallen off from the last report, owing to the fact that the freights on both routes, east and west, have been raised to such high rates that shippers cannot afford to send off anything but very high grade ore, or bullion assaying over 100 ounces of silver to the ton; and the larger portion of bullion falls far short of that amount. We think, however, that the prices will soon come down, so that the miners can realize something over freight. We have, as well as some others, stopped the shipping into this city of ore, until the freights will justify shipment. We have received and sampled 60 sacks, Velocipede ore, weighing 5,040 pounds, sent to THEO. F. TRACY, Esq., of Wells, Fargo & Co. One hundred and forty-six sacks, 13,397 pounds, T ore, brought for GEORGE BARRY. Seven hundred and seven sacks, 45,718 pounds, from the Montana mine in Tintic. Forty-two sacks, 3,971 pounds, from the Silver Shield. Twenty sacks, 2,295 pounds, from the Nabob. Fifteen sacks, 2,581 pounds, from the Chloride Point, for Mr. MEADER. Five hundred and forty-four sacks, 37,931 pounds, of Barstow ore, from Tintic. Two hundred and eight sacks, 16,508 pounds, copper, from the Mammoth mine in Tintic. One hundred and thirty eight sacks, 13,954 pounds, Sunbeam ore, from Mr. WHITNEY'S mine, bought by Mr. ARMSTRONG, Tintic. And 246 sacks, 17,112 pounds, from the Deseret mine, for Messrs. MARSHALL & CARTER of this city. Our shipments have been; East, none; West, none. Yours truly,

S. W. HOWLAN, & Co., per. L. B. THURMAN.

SALT LAKE CITY, May 20, 1871.—Our shipments during the week ending May 20, 1871, have been: 811 sacks of ore, on account of J. B. MEADER, weight 59,742 pounds, to RENO. One hundred and forty six sacks of ore, 13,345 pounds, on account of Omaha Separating and Refining Works. Fifty-seven bars of bullion, from the Wasatch Smelting Co., Ophir, consigned to the Omaha Separating and Refining Works. Our shipments of ore and bullion have almost ceased, on account of the rise of freights. N. P. WOODS & Co.

From the correspondence of the same paper we condense the following:

THE TIN MINES OF OGDEN.—The "Morning Star" mine, lately discovered in the vicinity of Ogden, gives encouragement to its owners. From the mine some of the ore was assayed in St. Louis, and gives 70 pounds of tin to the ton, also some arsenic, iron, and silver. The "Uncle Sam" mine, discovered by Mr. G. HORROCKS, contains antimony, iron, and silver. The "Copperopolis," owned by Messrs. HORROCKS & GILBERT, assays, ten feet down, $30 to the ton in silver, in which traces of gold are plainly to be seen.

OPHIR CITY.

East Cañon is, beyond a doubt, destined to become one of the most permanent mining districts of Utah. The mines are doing unusually well, and invariably has there been an improvement in the quantity and quality of ore by their further development. Many are as yet only prospects, awaiting capital to develop them into rich and successful mines.

Ophir City, situated about two miles up the cañon, and in the midst of the mines, is the base of supplies, and a promising town of over 125 comfortable business and dwelling-houses, and presents an appearance not unlike many Eastern towns. It has evidently been built with a view to permanency. Its natural advantages for mining purposes are unsurpassed. A beautiful and never-failing stream of spring water courses its way down the cañon from the mountains through the midst of the town, affording ample opportunities with an abundance of water for mills and smelters and for working the ores. There are now in successful operation two smelters: a third one is being built, and others are talked of. An arastra is also being built for working ores by a wet process, and is nearly completed. Stamp-mills in this cañon have heretofore been a myth, but the enterprising WALKER Brothers have opened the way to a reality. Their mill, of thirty stamps, to be driven by a 100 horse-power steam-engine, is now arriving at its site in the cañon, and will be in operation within sixty days. Its site, which is about one mile below Ophir City, was selected by Messrs. SHARP and J. R. WALKER a few days ago. Immediately after its location a rush was made for the spot by many of the citizens of Ophir; locating upwards of 100 building lots, and organizing a new town, which it is proposed to name Walkerville. Other mills, it is said, are on the way to Ophir, and will be in operation very soon.

CLIFTON DISTRICT.

C. B. BROWN, just in from the Clifton District, located near Deep Creek, reports the mine looking well. Smelting machinery is on the route for the camp. Miners are looking forward to a bright future, as present indications of leads prospected are satisfactory. There are now about five hundred tons of ore on the various dumps, of average quality. The usual disadvantages attending other districts in Utah, viz., want of machinery, are felt here.

BEAVER DISTRICT.

Through a letter received from a reliable party at Beaver, we are advised that the mines in that section are increasing in importance as the work of exploration and development goes on. The gold at Minersville still continues to attract attention, and it is thought to be rich. They were discovered by Captain Julian Bauseman's hands in sinking down on the site of the old lead mines.

THE COAL TRADE.

BENJAMIN R. WESTERN, COAL EDITOR.

Anthracite Coals.

NEW YORK, June 15, 1871.

WHOLESALE.—There is no improvement to quote in the market this week. Considering that we have already reached the middle of June it is surprising that so little interest is manifested in business. After a continuous strike of nearly six months in the coal regions, whereby the production was almost entirely suspended, and by which the trade run in deficit some 3,000,000 tons, one would suppose that every retail yard in the country was bare of coal, and all would be hungry for it. That the first is a fact there is no doubt, but the latter by no means seems to be the case. On the other hand, retail dealers do not appear to be at all alarmed, and express little or no concern about a supply. The general impression is, that prices have not yet touched bottom, and that this month's Scranton sale will denote lower rates, which will be taken as the starting-point in the market. Others are influenced by the fact that the Lehigh region is yet in suspension, and that when they get to work, turning in some 75,000 to n the market, it will make some difference in prices. These points are all very well ta[k]en, but, at the same time, will not an increased demand, coming all at one time, and the impossibility of all being supplied at one time, more than counterbalance the difference in the price of then and now?

If coal recedes in price at the next sale—say fifty cents per ton—and that price is taken as a basis for all to begin stocking up on, and a general rush in the market is made, which is apt to be the case, will not coal regain its price immediately, and in dihereto wil s of freight advance? It strikes us that such will be the case, and therefore it is questionable whether there is any advantage in waiting. One thing has been fully demonstrated in years back, that all cannot be supplied at one time, either in the coal or in the vessels to transport it, and the wise ones will therefore take heed and look out for their interests early. There is another advantage in buying during an easy market: you can take your choice of cargoes, which is not the case during an active demand, and on an advancing market. We throw out, therefore, general hints only to put buyers on their guard. In consequence of the extreme dull trade that has been experienced the past two weeks, prices are a shade off. Most of the coal can be purchased at about 25 cents below circular prices, and we understand that much of the coal sold at the last Scranton sale remains yet to be moved, and that the Company is urging the buyers to take it. Some of it has been sold at just what was paid for it, and considered good sales. It seems, therefore, to us, this is as good a time to buy as any we shall have.

Freights have declined some 25c. per ton to all points around the Cape and in the Sound, owing to the scarcity of orders; this, together with the decline of 25 cents from the circular prices of company coals, will in our opinion make up all the decline that can possibly take place at the next Scranton sale, which will no doubt recover itself shortly afterwards, equal to about 25 cents per ton, when freights will in turn again advance, as was the case after the last sale, and we shall virtually stand on the same ground that we do to-day, with an active demand to contend against. We offer these speculations for the consideration of our readers.

A pleasure party consisting of seventy-four, under control of A. M. WILDER, Jr., of the Wilkesbarre Coal and Iron Co., visited Mauch Chunk Pa., on Friday last, by invitation of the citizens of that place. They returned on Saturday, well repaid for their time spent. Further details of the excursion will be found elsewhere.

RETAIL.—The demand is limited. Prices range from $6 50 to $7 50 for Company coals, and from $7 50 to $8 50 for Lehigh and Special Coals.

LATER NEWS.

There is a rumor in the market that the Buck mountain men of the Lehigh region have accepted the operators' offer of February last, and that work will be resumed as soon as possible. If this be true, the entire Lehigh region may be considered as in full operation by July 1st. A private letter from Mauch Chunk, Pa., dated 13th, corroborates the above, and further states that, if the Buck mountain men accept the terms, it is equal to its acceptance by the entire region.

FREIGHTS.—We present the following circulars for the information of those interested:

Central Railroad Company of New Jersey.

GENERAL OFFICE, 119 LIBERTY STREET.

NEW YORK, June 1, 1871.

NOTICE TO COAL SHIPPERS—No. 14.

From this date, until further notice, the following tolls per ton, will be charged by this company, on Coal Shipments from Penn Haven, Mauch Chunk and Phillipsburg, to the several tide points named.

	From P Haven.	From M Chunk.	From Phillipsb'g.
To Mauch Chunk	$0 15		
To Phillipsburg	0 99	$0 84	
To Elizabethport	2 24	2 09	$1 25
To Port Johnston	2 24	2 09	1 25
To Newark	2 60	2 45	1 61
To Hoboken	2 24	2 09	1 25

The rate on Coal for way points on the New Jersey Railroads, will be $1 15 per ton, from Mauch Chunk to Phillipsburg.

The above tolls do not include Wharfage or Shipping Expenses at tide ports.

R. E. RICKER, Sup't and Eng'r.

SAMUEL KNOX, Secretary.

P. H. WYCOFF, General Freight Agent.

Delaware, Lackawanna and Western Railroad Company.

Morris and Essex Division.

RATES OF COAL FREIGHT.

On and after June 1st, 1871, and until further notice, the rates of transportation on Coal will be as follows, subject to the following

RULES AND REGULATIONS:

FIRST.—All claims for lost coal must be made by the shipper. This company will in no case settle claims with the consignee.

SECOND.—All claims for lost Lump Coal, for which the company may be responsible, will be paid for at the same rate per ton as this company and the iron furnaces in the Lehigh Valley pay for coal for their own use. The allowance for Chestnut will be twenty-five cents per ton less, and for Stove and Egg size, twenty-five cents per ton more than the Lump.

THIRD.—Coal will NOT be paid for if lost from being loaded in broken or defective cars, or in cars with the doors not shut close.

FOURTH.—Consignments less than five 4-wheel cars will be charged twenty-five cents per ton additional upon the following rates.

FIFTH.—Fifteen cents per ton will be charged, in addition to the above rates, for unloading any coal not unloaded by the consignee within twenty-four hours after its arrival, except coal unloaded at Newark in the pockets or bins of the company, where ten cents per ton will be charged on all coal to defray the expense of unloading, and twenty-five cents per ton per day demurrage will be charged if not removed within twenty-four hours.

SIXTH.—At Hoboken an additional charge of fifteen cents per ton from cars, and thirty-five cents from stock for shipping expenses, and ten cents per ton for wharfage will be made. Coal delivered in bin for consumption at Hoboken will be charged ten cents per ton additional to consumption rates.

FROM PHILLIPSBURGH.	In Lots exceeding five 4-wheel Cars.
To Stewartsville	$ 50
Broadway	60
Washington	80
Port Murray	1 00
Hackettstown	1 05
Waterloo	1 10
Andover	1 90
Newton	2 20
Branchville Junction	2 50
Lafayette	2 60
Branchville	2 75
Sparta	2 60
Franklin	2 85
Stanhope	1 15
Drakesville	1 20
Chester	1 80
Succasunna	1 65
Vanatta	1 55
Port Oram	1 35
Dover	1 35
Rockaway	1 45
Denville	1 55
Boonton	1 60
*Whitehall	1 75
Beavertown	1 80
*Mead's Basin	1 85
*West Paterson	1 90
Paterson	1 90
*Clifton	1 90
*Passaic	1 90
*Delawanna	1 90
*Rutherfurd Park	1 90
*Kingsland	1 90
*Bergen Siding	1 90
Morris Plains	1 75
Morristown	1 75
Madison	1 80
Chatham	1 85
Summit	1 90
Millburn	1 90
South Orange	1 90
Orange	1 90
Bloomfield	1 80
Montclair	1 85
Newark	1 60
Hoboken, for shipment	1 25
Hoboken, for consumption	1 70

All coal must be unloaded by the consignee, or at his expense.

B. A. HEGEMAN, General Freight Agent.

* Freight on coal for these stations must be prepaid at Phillipsburg before shipment.

Morris Canal and Banking Co.

RATES O ION ON COAL, FROM MAUCH CHUN VALLEY RAILROAD, OR LEHIGH CANAL AND MORRIS CANAL.

On and after Thursday, June 8, 1871, and until further notice, the rates of Transportation per Ton on coal will be as follows, subject to the following

RULES AND REGULATIONS:

FIRST.—All claims for deductions from manifest weights, of boats controlled by this Company, must be made by the consignee, and notice thereof given to this Company at the time the receipt for the cargo is filed in this office, but no deduction will be made for short weight, unless the cargo be weighed upon the wharf where it is discharged, and tickets given to the Captain for each load, and a statement from the weigh-master to that effect endorsed on the receipt.

SECOND.—The shipper or consignee will pay all charges on the connecting routes from Mauch Chunk, which amounts this Company will deduct from the rate of transportation.

THIRD.—Freights to Captains will be paid by this Company on all boats controlled by us. Consignees of *free* boats may pay freights to the Captains thereof, at the schedule rates of this Company (which amounts will be deducted from the rate of transportation), unless the manifest shall have been stamped "Freight to be settled at the Morris Canal Office."

FOURTH.—At Jersey City an additional charge of twenty cents per ton will be made for transferring Coal from boat to boat, and thirty cents per ton for placing the same on the wharves and re-shipping.

FIFTH.—In case of the sinking of the boat in tide water, the expense of raising the same will be distributed between the consignee, the owner of the boat, and the captain, in proportion to their respective interests.

SIXTH.—Captains will be paid $4 per day demurrage for the detention of any boat over the day of arrival and two working days in unloading, but no allowance will be made for stormy days which shall prevent unloading, or the day of towing (if destination is beyond Jersey City), or such days as it may be deemed unsafe to do the towing by the Company or its Agents. Statements of the amount of demurrage will be sent to the parties to whom bills have been rendered for transportation, immediately upon payment to the boatmen. Bills for demurrage will be sent monthly.

To New York	$ 2 59
" Jersey City	" 2 54
" " " for shipment	" 2 09
" Communipaw	" 2 54
" On River. Belleville	" 2 55
" On River. North Belleville	" 2 55
" On River. Passaic	" 2 60
" On River. Lodi	" 2 60
" On River. English Neighborhood, Englewood & Hackensack	" 2 75
" Newark	" 2 35
" Bloomfield	" 2 80
" Paterson	" 2 80
" Little Falls	" 2 90
" Pompton Feeder Lock	" 2 90
" Beavertown	" 2 80
" Montville	" 2 60
" Boonton	" 2 60
" Powerville	" 2 60
" Denville	" 2 55
" Rockaway	" 2 45
" Dover	" 2 35
" Irondale and Port Oram	" 2 35
" D. Basin and McCainsville	" 2 25
" Drakesville	" 2 20
" On Lake. Nolan's Point	" 2 45
" On Lake. Woodport	" 2 45
" Port Morris	" 2 20
" Stanhope	" 2 15
" Waterloo	" 2 10
" Hackettstown	" 2 00

JACOB F. RANDOLPH, President.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending June 10, 1871, compared with week ending June 11, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	31,881	1,028,672	112,134	1,111,582
Schuylkill Canal	3,957	71,383	32,626	218,681
Lehigh Valley R. R.	64,331	1,440,292	30,081	572,967
Lehigh & Sus. R. R.	23,418	419,936	33,978	343,032
Lehigh Canal	25,602	126,503	15,367	51,970
Scranton North	14,733	287,198	13,614	147,904
" South	35,402	788,589	45,822	
Penn. Coal Co., rail	25,169	478,989	25,309	67,974
" " canal	720	5,372	712	948
Del. & Hud. Canal Co.	49,350	494,609	41,837	101,358
" " East	6,231	188 810	8 056	69,148
" " West	1,954	35,924	2859	19,059
South	13,727	192,559	6,442	50,559
Shamokin	5,114	138,002	11,304	267,574
Trevorton	3,003	36,518		
Lykens Valley Coal Co.	3,159	13,535	2,258	33,956
Wyoming South	13,513	77,140		
Wyoming North				
P. N. Y. C. & R. R. Co.	4,865	132,708	4,479	48,758
Williamstown Co'y	6,584	119,262		
Big Lick Col	2,767	18,409	3,084	50,674
Total	336,080	6,084,410	389,962	3,156,344
1870		3,156,344	336,080	
Decrease		2,928,066		
Increase			53,882	

* Less coal transported for Co's use and Bituminous coal.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending June 10, 1871, compared with week ending June 11, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. R. R.	20,289	353,297	29,112	520,328
C. & O. Canal	18,478	177,255	18,778	251,403
H. & B. T. R. R.	6 874	134 276	6,847	165,096
Harrisburg & D.	14,185	344,227	17,679	358,599
L. V. R. R.		6,622		37,725
P. & N.Y.C. & R. Co.	5,787	101 501	6,483	133,061
Cumberl'd Branch	3,394	41,792	1,677	33,300
" Canal.	2,515	35,259	5,620	74,620
Total	71,522	1,194,229	86,196	1574,132
			71,522	1194,229
Increase.			14,674	379,903

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for week ending June 10, 1871, previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt
Total Wyoming	22,685 09	146,116 12
" Hazleton	10 00	222,328 00
" Upper Lehigh		442 06
" Beaver Meadow	42 19	75,443 03
" Mahanoy	14,273 06	219 692 19
" Mauch Chunk	1,239 05	3,593 14
" Sullivan & Erie	26 05	26 05
Total Anthracite	38,277 04	667,642 19
Bituminous Coal from all sources		37,725 00
Total by rail and canal	38,277 04	705,367 19
Same time last year	89,388 14	1,712,009 01
Increase		
Decrease	51,111 10	1,006,641 02
Forwarded East from Mauch Chunk by rail	30,081 04	572,966 13
Same time last year	64,931 04	1,440,292 04
Increase		
Decrease	34,850 00	867,325 11

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	30,081 04	572,966 13
To N. C. R. R., at Mount Carmel	1,076 16	2,967 13
Forwarded North from L. & B. Junction	5,943 12	50,396 09
To L. & S. R. R. at Packerton for rail	40 15	2,935 05
Delivered at M'h Chunk	10 00	436 16
Delivered on line of road above Mauch Chunk	170 00	4,457 16
Delivered above MauchChunk for use of L. V. R.R.	954 17	21,794 19
To L. & S. R. R., at Penn Hav., for railroad		94 10
Do. for canal		7,128 09
At M.Chunk for canal		4,464 09
Total Anthracite	38,277 04	667,642 19
Bituminous Coal		37,725 00
Total all kinds	38,277 04	705,367 19

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Sus. Div.)

Week ending June 10—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871., tons cwt.	WEEK 1870. tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	41340 06	32106 12	357775 14	464324 01
Upper Lehigh Region		4146 02	4614 06	53165 06
Beaver Meadow Region		5574 15		31223 09
Hazleton Region	57 09	12788 13	1802 01	66158 16
Mahanoy Region		195 04		195 04
Trescow Region	229 09		1565 11	
Mauch Chunk Region	7436 11		42728 18	30089 18
Totals	49063 15	54811 06	408486 10	65156 14
Increase				
Decrease	5747 11		256670 04	
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	33977 12	23417 17	343031 16	419936 00
Forwarded East of Mch Chunk by Canal	7830 16	25223 04	22832 01	130994 03
Delivered at and above Mauch Chunk	1157 05	814 01	23877 07	17688 15
Delivered to L. & B. R. R. at PlymouthBridge	2653 16	4798 03	5683 11	84633 11
L. V. R. R. at Packer'n	3454 06	558 01	13061 15	11904 06
Totals	49063 15	54811 06	408486 10	665156 14
Of the above there was transported on acc'nt of L. C. & N. Co.	10855 12		50759 10	46743 15
W.-B. C. & I. Co.	27380 13	18005 08	290236 19	205440 10
Totals	38236 05	18005 08	340986 09	252184 05
Increase	20230 17		88802 04	
Decrease				

Lehigh Canal Coal Trade.

Shipped for the week ending June 9, 1871.

	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total from Mauch Chunk Region,	9178 19	32455 16
" " Beaver Meadow "		728 12
" " Mahanoy "		1031 01
" " Hazleton "		1246 00
" " Upper Lehigh "		
" " Wyoming "	6187 17	16509 00
Total	15366 16	51970 09
Corresponding week last year	26902 07	126503 00
Increase		
Decrease	10235 11	74532 11

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, June 10, 1871.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt.
From St. Clair	42,780 07
" Port Carbon	7,867 08
" Pottsville	1,228 10
" Schuylkill Haven	33,975 13
" Pine Grove	6,134 12
" Tamaqua	18,431 11
" Harrisburg	
" Dauphin	6,294 16
Total	116,712 17

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	10,081 12
" Mill Creek "	2,072 19
" Schuylkill Valley Scales	2,355 09
" Mt. Carbon "	2,283 01
" Cressona "	12,472 16
" Pine Grove "	
" Tamaqua "	2,344 17
Total	31,590 05

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	2,177 03
" Shamokin	2,214 09
" Herndon	
Total	4,391 12

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	886 12
" Lebanon & Pine Grove Branch	659 06
Total	1,545 18

CONSUMED ON LATERALS.

From Frackville Scales	659 03
" Mill Creek "	579 08
" Schuylkill Valley Scales	805 01
" Mt. Carbon "	280 16
" Cressona "	82 17
" Pine Grove "	80 07
" Tamaqua "	198 02
Total	2,615 14

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	25 15
" " Alburtis, " "	44 01
" " Oreland, G. & N. Br.	67 05
" " Connecting R. R. " "	
" " Willow Street R. R.	21 17
Total	158 18

BITUMINOUS.

From Harrisburg	11,384 1
" Connecting R. R., G. & N. Br.	
" Junction R. R.	166 09
Total	11,551 00

COAL FOR COMPANY'S USE.

Anthracite	2 809 11
Bituminous	273 17
Total.	3,083 08

RECAPITULATION.

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val. Branch	116.712 17	36,357 08	i 80,355 09
For Shipment by Canal	31,590 05	3,322 12	i 28,267 13
Shipped Westward via Northern Central R. R.	4,391 12	3,542 17	i 848 15
Shipped West or South from Pine Grove	1,545 18	218 05	i 1,327 13
Consumed on Laterals	2,615 14	2,163 09	i 452 05
Lehigh and Wyoming Coal	158 18	1,721 18	d 1,563 00
Total Anthracite paying fr'gt	157,015 04	47,326 09	i 109688 15
Bituminous	11,551 00	9,697 17	i 1,853 03
Total of all kinds paying fr'gt	168,566 04	57,024 06	i 111541 18
Coal for Company's use	3,083 08	1,142 07	i 1,941 01
Total Tonnage for Week	171,649 12	58,166 13	i113482 19
Since Dec. 1, 1870	1770648 08	1537906 07	i232742 01
Total to date	1942298 00	1596073 00	i346125 00

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	30,185 00	3,357 10	i26827 10
" Port Clinton	2,441 00	238 00	i 2,203 00
Total Tonnage per Week	32,626 00	3 595 10	i29030 10
Since Dec. 1, 1870	186,055 07	67,937 15	i11811712
Total to date	218,681 07	71,533 05	i147148 02

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, June 10, 1871:

	tons. cwt.
From St. Clair	42,780 07
" Port Carbon	7,867 08
" Pottsville	1,2 8 10
" Schuylkill Haven	34,044 18
" Auburn	7,712 09
" Port Clinton	18,431 01
" Allentown and Alburtis	69 16
" Harrisburgh and Dauphin	17,679 07
Total paying freight	129,813 16
Coal for Company's use	3,083 08
Total for week	132,897 04
Previously this year	1,333,836 07
Total	1,466,733 11
To same time last year	1,373,954 14

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, June 10, 1871.

	Tons. Cwt.
From Port Carbon	— —
" Pottsville	— —
" Schuylkill Haven	30,185 00
" Port Clinton	2,441 00
Total for week	32,626 00
Previously this year	186,055 07
Total	218,681 07
To same time last year	71,383 05

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending June 10, 1871.

	WEEK.	SEASON.
By Del. and Hud. Canal	41,837 00	101,358 00
By Railroad East	8,056 00	69,148 00
" West	2,859 00	19,059 00
" South	6,442 00	50,559 00
TOTAL TONS,	59,194 00	240,124 00
For the same period last year.		
By Del. and Hud. Canal	49,350 00	494,609 00
By Railroad East	6,231 00	188,810 00
" West	1,954 00	35,924 00
" South	13,727 00	182,559 00
TOTAL TONS,	71,262 00	901,902 00

Delaware, Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna and Western R. R. for week ending June 10, 1871.

	Week. Tons. Cwt.	Year. Tons. Cwt.
Shipped North	13,613 12	
Shipped South	45,822 1	
Total	59,435 13	147,904 1
For the corresponding time last year:		
Shipped North	14,733 6	.....
Shipped South	35,401 18	.....
Total	50,135 4	1,076,148 16
Increase	9,300 9	.....
Decrease	.....	928,244 15

Pennsylvania Coal Company,

Shipments of Pittston Coal for the week ending June 10, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	25,369 5	67,974 7	25,168 12	478,988 13
" Canal	711 12	948 1	719 16	5,372 7
Total	26,020 15	68 922 8	25,888 8	484,361

Decrease 1871, 415,438 12 tons.

Shamokin Coal Trade.

For week ending June 10, 1871	11,303 15
Same time last year	5,114 08
Increase	6,189 07
Decrease	
Total amount shipped to date	267,574 08
Same time last year	138,001 19
Increase	129,572 09
Decrease	

Huntington and Broad Top R. R. Co.

For week ending June 10, 1871	6,847 tons.
Same time last year	6,874 "
Increase	.... "
Decrease	27
Total amount shipped to date	165,096 "
Same time last year	134,276 "
Increase	30,820 "
Decrease	....

Report of Coal forwarded by Pa. & N. Y. R. R. Co., for week ending June 10, 1871.

	ANTHRACITE. Tons. Cwt.	BITUMINOUS. Tons. Cwt.
By Rail	4,478 19	6,482 19
Previously this year	44,279 03	126,578 06
Total by Rail	.....	.....
By Canal	.....	.....
Previously this year	.....	.....
Total by Canal	.....	.....
Total for the year	48,758 02	133,061 05
To the same time last year	132,708 05	101,501 00
Decrease	83,950 03	
Increase		31,560 05

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday June 10, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B.&O.R.R. Co Tons. Cwt.	Total. Tons. Cwt.
1871	18,777 14	29,111 11	47,889 05
1870	18,477 16	20,288 12	38,766 08
Increase.	299 18	8,822 19	9,122 17
Decrease			

YEAR.

1871	251,403 04	520,328 04	771,731 08
1870	177,254 11	353,297 01	530,551 12
Increase.	74,148 13	167,031 03	241,179 16
Decrease			

Cumberland Branch.

WEEK.

1871	5,620 10	1,676 12	7,297 02
1870	2,515 05	3,394 02	5,909 07
Increase.	3,105 05		1,387 15
Decrease		1,717 10	

YEAR.

1871	74,620 13	33,300 01	107,920 14
1870	35,259 04	41,792 02	77,051 06
Increase.	39,361 09		30,869 08
Decrease		8,492 01	

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK, May 30. R. A.	W. A.	AT PHILADELPHIA, May 29. R. A.	W. A.
Lump	$— —	$— —	— —	— —
Steamer	6 50	— —	— —	— —
Broken	7 50	— —	— —	— — to — —
Egg		— to —	— —	— — to — —
Stove		— —	— —	— — to — —
Chestnut	— —	— —	— —	— — to — —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	— —	7 30	— —	— —
Broken	— —	6 55	— —	— —
Egg	— —	6 55	— —	— —
Stove	— —	7 05	— —	— —
Chestnut	— —	6 05	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A. 7 50	@8 00	— —	— —
New England	" "	— —	— —	— —
Locust Mountain	W. A.	8 50	— —	— —
Honey Brook, Le'h	W. A.	— —	— —	— —
Spring Mountain	" "	— —	— —	— —
Sugar Creek	" "	— —	— —	— —
Sugar Loaf	" "	— —	— —	— —
Old Comp'y's	" "	— —	— —	— —
Cross Creek	" "	— —	— —	— —
Room Run	" "	— —	— —	— —
Girardville	" "	— —	— —	— —
McMichael	" "	— —	— —	— —
Shamokin	" "	7 25	— —	— —
Lykens Valley	" "	7 75	— —	— —
Broad Top	" "	6 25	— —	— —
Hill & Harris	" "	7 25	— —	— —
Henry Clay	" "	— —	— —	— —
Powelton	" "	6 25	— —	— —

[*Dealers in these coals may be found in our advertising columns.]

Company Coals.

June, 1871.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port	5 00	5 25	5 50	5 75	6 00	5 25
*Pittston at Newburgh	5 50	5 50	5 20	5 80	6 00	5 30
*Lackawanna at Rond't	5 25	5 50	5 50	5 75	6 00	5 20
Wilk'b're at Hoboken	5.00	5 00	5 40	5 75	6 00	5 25
Old Co. Lehigh at Pt. Johnston	6 75	6 00	6 00	6 00	6 50	5 50
Lehigh at E. Port	— —	— —	— —	— —	— —	— —

For freights to different points see "Freights."

* To contractors.

Line Prices for Coal June, 1871,

	Lump	Broken	Egg	Stove	Ches't
At Mauch Chunk	4.50	4.00	4 00	4.25	3.50
" Wilkesbarre,	— —	3.75	3.75	4.00	3.25

Prices at Baltimore—June, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 25@5 50
Pittston and Plymouth, do	5 25@5 40
Shamokin Red or White Ash, do	5 25@5 40
Lykens Valley Red Ash, do	— —@5 50
Zerba Valley	— —@— —
Treverton	— —@— —
By retail, all kinds per ton of 2240 lbs	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	— —@4 75
Fairmount and Clarksburg gas, f. c. b. at L. Point	6 00@6 50

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein	f.o.b. at Phila.	$ —
" " Lemon	" "	—
Cumberland Vein Coal	" "	—
Consolidation Coal Co.'s on board	N. Y.	6 75
Maryland Coal Co.	"	6 75

Prices at Georget'n, D.C., & Alexandria, Va.

June, 1871.

George's Creek and Cumberland f. o. b. for shipping $4 50 @4 60.

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$5 50@5 75
Lykens Valley	6 00@6 25
Shamokin Red or White Ash	5 50@6 00
Treverton and Zerba Valley	— —@— —

Prices of Gas Coals.

June, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y.

	Duty, $1 25, gold. Coarse	Slack.
Block House	$1 75 @—	1 75
Gowrie	1 75 @—	1 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@— 80
Lingan	1 60	@— 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@— 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	7 10 @7 25
Fairmount Gas Coal Co. of N. Y.	7 50 @— —
Despard Coal Co.	$7 50 @— —
Penn.	7 75 @8 00
Newburg Orrel Gas	— — @— —
West Fairmount Gas Coal	8 00 @— —

AT PHILADELPHIA.

Powelton	$7 75

Prices of Foreign Coals.

June, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELEE BROS., No 32 Pine street New York.

Liverpool Gas Caking	$ 9 00@— —
" " Cannel	11 50@12 50
" House "	— —@16 00
" Orrel	12 00@14 00

Per ton 2,240 lbs. ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered.

Freights.—June, 1871.

TO EASTERN PORTS.	Cumberland. From Georgetown.	From Baltimore.	Anthracite. From Philada.	From East Port, and Hoboken.	From Newburg...	From Rondout....
Amesbury	$2 75		$2 50	$1 75		
Bangor	2 75	2 75	2 30	1 50		
Bath	2 50	2 50	2 30	1 75		
Boston	2 50	2 50	2 25	1 50	180	1 80
Bridgeport	2 25	2 25	1 80	1 00	1 10	1 25
Bristol		2 60	2 00	1 25		1 55
Cambridgeport			2 75	1 75		
Derby			2 00	1 20		
Dighton	2 30	2 35	2 30	— —		
East Cambridge			2 35	1 75		
Fall River	2 25	2 25	2 25	1 25	1 40	
Hackensack			1 75	1 00		
Hartford	2 50		2 30	1 40		
Jersey City		2 60	1 40	50	70	
Middletown			2 25	1 25		
Mystic			— —	1 25		
New Bedford	2 30	2 35	2 60	1 25		
Newburyport	2 25		2 40	1 60		1 35
New Haven	2 25	2 25	1 90	1 00	1 10	1 20
New London	2 25	2 25	1 76	1 05		1 25
Newport			2 00	1 25		1 40
New York	2 00	2 00	1 35	50	70	65
Norwalk			1 80	1 00	1 10	
Norwich	2 50	2 25	2 00	1 10	1 40	1 50
Pawtucket	2 50	2 40	2 30	1 50		1 65
Portland	2 50	2 60	2 30	1 50		2 00
Portsmouth, N. H	2 75	2 75	1 45	1 60		1 50
Providence	2 25	2 25	2 00	1 25	1 50	
Rockport			2 10	1 65		
Saco	2 75		2 25	1 75		
Sag Harbor			1 70	1 20		
Salem	2 60	2 75	2 35	1 50		
Stamford			2 00	1 00	1 10	
Stonington			2 00	1 25	1 20	1 40
Taunton			2 30	1 60		
Warren			— —	1 40		
Washington			1 25			
TO RIVER PORTS.						
Albany		80			55	
Catskill		70			50	
Cocksackie		70			50	
Coeyman's		70			65	
Cold Spring	2 20	70			30	
Fishkill		70	1 60		30	
Haverstraw					60	
Hudson	2 20	2 25			40	
New York					60	
Nyack			1 75		30	
Poughkeepsie					30	
Rhinebeck					75	
Rondout					40	
Saugerties			1 60		75	
Sing Sing					75	
Stuyvesant					75	
Tarrytown					55	
Troy						
West Point			1 75			
Yonkers					60	

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption	$1 85
For reshipment	1 85

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 84
C. R. R., N. J., Phillipsburgh to Elizabethport	1 25
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 44

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 84
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 25
Shipping expenses	25
Warfage	10
Total	$2 44

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	$ 84
Morris & Essex R. R. Phillipsburgh to Hoboken	1 45
Shipping expenses	25
Warfage	10
Total	$2 64

TO SOUTH AMBOY.

L. V. R. R.	84
R. & D. R. R. / Cam. & Am. R. R.	1 15
Shipping Expenses	25
Total	$2 24

PENN HAVEN TO ELIZABETHPORT.

L. V. R R Penn Haven to Phillipsburgh	99
C. RR. of N. J. Phillipsburgh to Elizabethport	125
Shipping expenses	25
Wharfage	10
Total	$ 2 59

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 25
" Port Carbon	....
" Port Clinton	1 17

TO NEW YORK.

From Schuylkill Haven	$1 90

The Rates of Toll on Lump and Steamer Coal will be ten per cent less than the above rates. The charge will be per ton of 2240 lbs. No charge less than Forty Cents per ton will be made for any distance. A drawback of thirty cents is allowed on all coal passing Fairmount Locks used at Philadelphia and vicinity.

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$ 80
Freight and towage	1 02
Total	$1 82

TO NEW YORK.

Lehigh Canal	$ 50
Morris Canal / Freight / Towing	2 29
Total	$2 79

TO JERSEY CITY.

Lehigh Canal	$ 50
Morris Canal / Freight	2 09
For re-shipment	2 59
Total	$2 84

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 50
Delaware Division Canal	30
Delaware and Raritan Canal	46
Freight	1 05
Towage	20
Total	$2 51

TO NEW BRUNSWICK.

Lehigh Canal	$ 50
Delaware Division Canal	30
Delaware and Raritan Canal	46
Freight	1 05
Total	$2 31

Foreign and Provincial Freights.

June, 1871.

Foreign.

Newcastle and Ports on Tyne, per kesl of 21 1-5 tons	£14 00@£16 00
Liverpool, 5 per cent primage	13s @15s ton.

TO NEW YORK.

Provincial.

Sidney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.

Sydney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

MARKET REVIEW.

IRON.—The market for Scotch Pig has again assumed a quiet tone; the recent sales have pretty well supplied the Trade, who purchase only as immediate wants compel, and prices are not very firm; 300 tons Glengarnock sold at $30@30 50; and 200 do. Eglinton, on private terms. American continues in moderate request, but as there is very little obtainable, prices are supported. We notice sales of 50 tons No. 1 Carbon at $35; and 100 do. Hudson, on terms not made public. The market for new English Rails has been quite active, and sales have been made of about 8000 tons 56 lb., here and to arrive, on private terms, the market closing firm at $55@57 gold for English, and $70@72 currency for American, at the works in Pennsylvania. Refined Bar, from store, continues dull at nominally unchanged prices. There continues a good demand for Russia Sheet, and prices are a trifle firmer, closing at 12c. gold for parcels on the spot, and the tendency is still to harden; the sales are 100 packs at 11⅛@12c.; and to arrive, 2300 do., 11⅛c., both gold.

COPPER.—The manufactures of Copper and Yellow Metal are steady at our quoted prices. Ingot continues in very moderate request for manufacturing, at the prices previously current; sales have been made of 150,000 lb. Lake at 21¼@21½c.; 100,000 lb. do. for forward delivery, 21½c., and 50,000 lb. on private terms.

LEAD.—Pig moves very slowly, and prices are without improvement; we have only to notice the sale of 25 tons Spanish at $6 15 gold. Bar, 8¾c. Sheet and Pipe, 10½c., and Tin-Lined Pipe 15c., all usual discount to the Trade.

SPELTER.—There continues an active speculative demand, based upon favorable European accounts, and further sales have been made of 100 tons Silesian, on the spot, at 5¾@5¾c.; 50 do., to arrive, 5¾c., gold; and 75 do., also to arrive, on private terms; at the close, 6@6⅛c., gold, was generally demanded.

STEEL.—Is unchanged.

TIN.—The demand for Pig is still very limited; but, holders being strengthened by favorable European advices, display more confidence and have advanced their pretensions a little; the nominal prices now are, for Banca 38c., Straits 32¼@32½, and English 32½, all gold. Plates continue to sell moderately at steady and firm prices; the transactions embrace 1600 bxs. Charcoal Tin at $8 37½ for I. C.; 250 do. I. C. Coke, $7 62½@7 75; and 300 do. $7 25, all gold.

ZINC.—Continues firm and in good demand; 200 casks Mosselmann sold, to arrive, at 7¾c. less 4 per cent., gold. Manganese black oxyde is quoted at 4½c.; do. pyrolusite gray, 5½c., currency.

METALS.

NEW YORK, June 14, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1¼ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb: Pig, $7 ℔ ton; Polished Sheet, 3cents ℔ lb; Galvanized 2½; Scrap Cast, $6; Wrought, 8 per ton.

	Store Prices.
Pig, Scotch No. 1, ℔ ton	29 00@34 00
Pig, American, No. 1	34 00@36 00
Pig, American, No. 2	32 00@34 00
Pig, American, Forge	31 00@32 00
Bar Refined, English and American	74 00@75 00
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes	105 00@115 00
Bar, Refined, ord'y sizes	75 00@ 77 50
Bar, Refined, ¼ @ 5-16 inch	82 50@ 85 —
Bar, Common	72 00@ 75 00
Scroll	95 00@125 00
Ovals and half-round	95 00@120 00
Band	90 00@ 95 —
Horse Shoe	95 00@100 00
Rods, ⅜ to 3-16 inch	82 50@120 —
Hoop	100 00@140 00
Nail rod	— —@6¾ —
Sheet, Russia, as to assortment (gold)	12 @— —
Sheet, Single, D, and T. Common	—¼@— 6
Sheet, Galv'd, Nos. 14 to 26	12@14 and 33⅓ ct. dis.
" " Nos. 27, 28, and 29	15@18 and 30 ℔ ct. dis.
Rails, English (gold). ℔ ton	55 00 @57 00
Rails, American, at Works in Pa	70 00 @72 00

STEEL.—Duty: Bars and Ingots, valued at 7 cents ℔ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb. and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality)	℔ lb	— 15	@— 18
English Spring (2d and 1st quality)	"	— 7	@— 10
English Blister (2d and 1st quality)	"	— 10	@— 17
English Machinery	"	— 11½	@— 14
English German (2d and 1st quality)	"	— 12	@— 14
American Blister "Black Diamond"	"	— —	@— 12
American, Cast, Tool	do.	— 15	@— 16
American, Spring,	do.	— 9	@— 11
American Machinery,	do.	— 10	@— 11
American German,	do.	— 9	@— 11

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	36 @— 38
Copper, Old Sheathing, &c. mixed lots	— @— 19
Copper, old, for chemical purposes	20 @— 21
Copper, American Ingot	21½@— 21¾
Yellow Metal, New Sheathing & Bronze	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2¾ cents ℔ lb.

Galena, ℔ 100 lbs	$— — @— —
Spanish (gold)	6 12½@6 18
German, do.	6 12½@6 18
English, do.	6 15 @6 50
Bar (net)	— — @8 75
Pipe (net)	— — @10 25
Sheet	— — @10 25
Colwell, Shaw & Willard Tin-Lined Pipe 15 cts. ℔ lb.	

SPELTER.—Duty: In Pigs, Bars & Plates, $.150 p. 100 lb

Plates, Foreign	(gold)	p. 100 lb.	5 87½@ 6 25
Plates, Domestic		p. lb.	— 7 @— 11

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.: Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	— @38
Straits	32½@32¾
English	— @32½

PLATES. Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box	$8 50 @8 75	$9 75 @10 25
I. C. Coke	7 25 @8 00	8 25 @ 9 25
Coke Terne	6 12½@7 25	7 00 @ 8 25
Charcoal Terne	7 75 @8 50	9 00 @ 9 75

ZINC.—Duty: Pig or Block, $1 50 ℔ 100 lb.; Sheet, 2½cts. ℔ lb.

Sheet, No. 9 to 11 Foreign ℔ lb.— 8¾@—9¼

Mining Stocks.

NEW YORK, June 15, 1871.

There is but little change to note in Gold Stocks. Sales of 200 Gregory were effected this A. M. at 50 and 100; Smith & Parmlee at 40. In miscellaneous stocks Canada Mining "Copper" is quoted at 55. The following is the report of the Board:

GOLD STOCKS.

	BID.	ASKED.
American Flag	17	—
Bates & Baxter	30	—
Benton	—	10
Black Hawk	25	30
Central Gold	6	9
Cons Gregory	—	50
Grass Valley	13	14
Gunnell	18	40
La Crosse	15	21
Liberty	—	3
Mariposa prf	—	—
Montana	—	—
Rocky Mount	—	—
Quartz Hill	35	42
Smith & Parmlee	—	—
N. Y. & Eldorado	—	—

The market in Petroleum Stocks is nominally unchanged, if we may accept the version of it as given by the Mining Stock Board. A sale of 300 Second National was made at 20, which is the only transaction reported. Below is a full report of the Board.

PETROLEUM STOCKS.

	BID.	ASKED.
Bergen Coal and Oil	16	—
Rennehoff Run	29	—
Blood Farm	—	50
Brevoort	30	—
Bliven Oil	20	—
Buchanan Farm	40	—
Central	65	—
Clinton	—	—
Home	160	175
Phillips Pet	—	—
Rynd Farm	35	40
United Petroleum Farms	25	30
United States	60	70
National	—	—
New York & Allegheny	80	—
Northern Light	30	—
Pithole Creek	60	—
Rathbone Oil	24	—
Second National	20	—
Sherman & B	—	—
Tarr Farm	20	—
Hoffman	9	—

San Francisco Stock Market.

Our report from the San Francisco Mining Stock Board, "per Telegraph," is dated California, June 13. Without exception all stocks on the list have advanced, Crown Point selling as high as 320 and Kentuck 125. No sales of Amador are reported. Below is the table in full.

Savage	44¼
Yellow Jacket	71
Kentuck	125
Chollar Potosi	53½
Gould & Curry	88
Belcher	175
Imperial	—
Amador	—
Crown Point	320
Hale & Norcross	—

VERMONT SLATE TRADE.

REPORT of Slate Shipped from Middle Granville, N. Y., via the R. & S. R. R., for the week ending June 10, and for the year 1871.

ROOFING SLATE.

NO. OF SQUARES.	Week.	Prev'ly.	Year.
†Penrhyn Slate Co	225	1,731	1956
New York / *and Middle Granville Slate Co	260	1,720	1980
†American Slate Co	....	....	....
Benj. Williams	....	695	695
Jones & Williams	....	60	60
Eagle Slate Co	....	795	95
Mettowee Slate Co	50	265	315
Albany Slate Co	65	245	310
H. W. Hughes	....	30	30
Total	....	....	—

MILL STOCK, MANTLES, &C.

NO. OF CASES SHIPPED BY	Week.	Prev'ly.	Total
Eagle Slate Co	cars....	....	....
Penrhyn Slate Co	" 94	1,812	1,906

BLACK BOARDS.

NO. OF CASES.	Week.	Prev'ly.	Total.
Eagle Slate Co	....	....	....
Penrhyn Slate Co	....	....	....

MILL STOCK, &C.

NO. OF CARS SHIPPED BY,	WEEK.	PREVIOUSLY.	YEAR.
Eagle Slate Co	cars. 1	14	15
Penrhyn Slate Co	....	....	....

* Sales made together this season.

† Consolidated Sales.

Yield of the Placers of Gold Run District, Cal.

THE following is sent to us by Mr. W. A. SKIDMORE, the writer of the article on "Placer Mining," published by us a short time ago. It is a valuable supplement to his remarks on Gold Run District:

Mr. W. H. PETTEE, of the State Geological Survey of California, has made an interesting calculation of the average yield per cubic yard of the dirt washed in this district. The superficial area of Gold Run District, from the C. P. Railroad southerly to the place where the deposit has been broken off by the cañon of the North Fork, is estimated at 860 acres, of which about one-half has been worked over—not "worked out," as the bed-rock has only been reached at the southerly extremity, in the ground of the Cement Mining Company. Mr. PETTEE made careful measurements of the height of the bank of the excavations at various points on both sides of the channel or deposit, from which he estimates that forty-three millions (43,000,000) cubic yards of dirt have been removed by hydraulic process. As the gross product of the district, as given by Messrs. MOORE & MINER, is about $2,100,000, it will be seen that the average yield has not been over five cents per cubic yard—and yet hydraulic mining has been carried on here with large profit to owners of the ground. This calculation embraces only the product of the surface-dirt, as there is still from one hundred to two hundred feet of gravel and cement underlying this excavation, which, when worked down to bed-rock, will probably bring up the average yield per cubic yard of the district to figures approximating those of claims between the Middle and South Yubas. In the latter class of claims where, as we have seen, the average per cubic yard has reached 20 to 25 cents, the channel has been stripped to the bed-rock, and the richest dirt found on the bottom.

The Geological History of the Mountain of Montarville.

THE following lecture was delivered by Dr. T. STERRY HUNT, of the Canada Geological Survey, on the occasion of the annual excursion of the Natural History Society of Montreal to Montarville:

The President of the Society, Principal DAWSON, F. R. S., after a few remarks, introduced the speaker, who proceeded to give a brief notice of the Mountain of Montarville and its geological history. This mountain, he said, stands in the northeast part of the Seigniory of Montarville, and being near the Seigniory and Parish of Boucherville, is sometimes known as Boucherville Mountain. The family BRUNEAU, the present lords of the manor, to whose kind courtesy the Natural History Society was indebted for the privilege of holding its meeting on the domain, have however caused the parish church near by to be dedicated to St. Bruno, and hence the mountain, or rather the group of hills around, was now frequently spoken of as the Mountains of St. Bruno. In proceeding to speak of its geological history, Dr. HUNT remarked that Montarville has so much in common with the adjacent mountain of Belœil, which the Natural History Society had visited two years since, that much of what he then said would be equally applicable to the present occasion. He next proceeded to describe the two great classes of rocks into which most of the solid portion of the earth's crust may be divided, viz.: stratified and erupted rocks; the former being chiefly layers of sand, clay, and carbonate of lime, deposited as sediments from water, and subsequently hardened into rocks, somewhat as mortar and cement harden. These sediments, many thousand feet in thickness, accumulated during ages in the subsiding bottom of the ocean, and inclose the fossil remains of the various species of animals and plants which then lived. The erupted or non-stratified rocks are found breaking through the stratified rocks of various periods, from the oldest to the most recent. They are composed of crystalline minerals, chiefly different species of feldspar, mica, hornblende, pyroxene or augite, olivine and quartz.

The nature of these various minerals and of the different rocks which are made of mixtures of two or more of them was then explained, showing the difference between granite, trachyte, syenite, dolerite, diorite, and basalt, all of which are erupted rocks. Many of these, from their peculiar jointed structure, occasionally show at their out-crops a step-like arrangement, which has procured for them the common name of trap, from a Swedish word signifying a stair. It is applied indiscriminately to almost all ancient erupted rocks, and has therefore little scientific value. Such rocks are closely related to the lavas of modern volcanoes, which when solidified under presure resemble trachyte, dolerite, basalt, etc. As the source of lavas is many thousand feet beneath the surface, the lower parts of the lava columns must always be thus solidified. Dr. HUNT then proceeded to explain that Montarville was the site of an ancient and extinct volcano belonging to paleozoic times, and that the crystalline rocks there seen were the basal portion of the former eruptions of lava. The whole valley around being the northward extension of the valley of Lake Champlain to the St. Lawrence, had in paleozoic times been filled with soft stratified rocks to a height much above the present summits of Mount Royal and Belœil, and presented a plateau above which probably active volcanoes marked the sites of the mountain just named, and of Rougemont, Yamaska, Monnoir, and Montarville. In some cases, however, there is reason to suspect that there may be masses of erupted rock which never came to the surface, and hence did not appear as active volcanoes in subsequent ages. The eroding action of the elements, air and water, cut away the soft sedimentary rocks, and swept away the volcanic peaks, leaving little more than the hard cones of crystalline rock below, which were better able to resist the eroding agencies. He called attention to the fact that the stratified sediments near their contact with the erupted rocks had been much hardened, and still remained in place, preserving, however, their fine grain, and showing fossil shells within a few inches of the line of contact with the crystalline dolerite, near the spot where the company stood. The slow disintegrating action of the air, water and frost was shown in the crumbling of this crystalline rock beneath their feet, a process to which the oxidation of iron pyrites which had given rise to white crusts of soluble sulphates of iron and magnesia contributed. The supposed source of erupted rocks was briefly alluded to as probably the fusion of deeply-buried stratified rocks, and the fact was noticed that not only different volcanoes in the same region, but the same volcanoes at different periods, discharge lava of very unlike character. This fact was then compared with the unlike character of the various mountains of erupted rock around us. Thus Belœil was in great part, at least, a micaceous diorite, Monnoir a diorite of another type. Yamaska presents two kinds of erupted rock, unlike either of these. Montarville, though in a great part a dolerite consisting of a coarse-grained mixture of black pyroxene with white feldspar, shows in the hill rising from the lake just behind the manor-house, a rock of very different type, consisting of a coarsely crystalline mixture of dark green pyroxene with a considerable amount of amber-brown olivine or chrysolite, which in other parts of the mass is associated with a white feldspar and with black pyroxene. The various rocks of these different mountains have been described in detail by the speaker in "The Geology of Canada." He concluded by saying that the stratified rocks around the mountain have a history not less beautiful and curious than that of erupted rocks, and would now be described by one far more competent to the task than himself—Principal DAWSON.

Dr. HUNT concluded his remarks amid much applause.

Principal DAWSON then said that ancient though the volcanoes referred to by the last speaker were, there were still more ancient facts represented by some of the specimens which had been collected. The fossil shells and crinoids represented by specimens which he exhibited, showed the evidences of an ancient Lower Silurian sea, which once overspread all the plain of Canada, and in which flourished multitudes of curious creatures now extinct. He particularly referred to the brachiopods or lampshells and to the crinoids or stone lilies, some curious specimens of which had been collected. He then thanked the company for their presence, referred to the fact that the excursion had been honored by the presence of the Director of the Geological Survey and by many of the *elite* of the citizens of Montreal, and to the kindness of the lady of the manor, who had so liberally given them the use of her grounds; and cordially invited all who might have been interested in the day's work to connect themselves with the Society. The President was warmly applauded.

It was now past four, and the rain continuing to fall lightly, the *voitures* were again in requisition, and the party returned to the Boucherville station. A train came along about six, and brought the tired excursionists back to the city without any incident worthy of mention.

A Trip to the Coal Mines.

THE excitement of the recent strike in the Coal Regions having died away, about seventy-five gentlemen connected with the coal trade in New York took advantage of the delightful weather of Friday last, and left in a special car via the New Jersey Central Railroad, for Mauch Chunk, Pa. A. M. WILDER, Jr., and LEWIS H. ROGERS, of Brooklyn, together with NATHAN BARNEY, Esq., of New York, had the party in charge. Arriving at Mauch Chunk, after a four hours' ride, the party put up at the Mansion House, with appetites worthy of the best efforts of our host, Mr. E. S. BOOTH, who was all alive to anticipate our every want and comfort. After freely discussing the bountiful meal, the ladies and gentlemen of the party adjourned to the spacious piazzas, where the gentlemen regaled themselves with their Havanas. At ten o'clock the band of music which had accompanied the party from the city, gave notice that the ball-room was in order, and thither we all went to "trip the light fantastic toe." A choice selection of twenty dances, under an able floor committee, consisting of Messrs. C. E. BEEBE and L. E. WESTON, of New York; R. B. FITHIAN and W. B. DICKIE, of Brooklyn, and G. W. ESSER, of Mauch Chunk, was partly disposed of up to 12 o'clock, when the party adjourned to a sumptuous supper and champagne, duly provided in the dining hall.

At 9 o'clock next morning, breakfast being over, preparations were immediately put on foot for the ascent of Mount Pisgah, and a ride on the famous Switch-Back railway. At the top of the hill, beyond the residence of Judge PACKER, we found an ample number of cars for the accommodation of our party. The signal is given, and away we go—up an incline of 2,322 feet. From the summit the cars run by the force of gravity to the foot of the next plane, up which they are also raised by a stationary engine. This plane takes its name from the mountain—Mount Jefferson—and is 2,070 feet long, the summit being 1,530 feet above the Lehigh river, and one mile from Summit Hill. The latter place we reached in a few minutes. Here there are many valuable mines, and quite a large settlement, but it seems to us, denizens of the city, to be out of the limits of civilization. We alighted for a few minutes, to visit a mine, and see the "black diamonds" rapidly brought forth from its opening. We also examined the breaker, and the machinery for preparing the coal for market, while some of the party climbed up the hill and gathered armfulls of blooming mountain laurel, wherewith to decorate the car and their persons. Small boys connected with the mines, with their coal-blacked hands and faces, offered for sale small polished blocks of coal, trinkets of coal, also fossils which are from time to time found in the mine.

On re-entering the cars, we really begin our trip in the famous Switch-Back railway. The descent is made by gravity, and the direction changed at various points by switches. The car, by the momentum it has gained, is carried for a short distance up a steep ascent, from which, by the returning descent, it is forced on another track, upon which, by an automatic arrangement, it has been switched. In this manner the trains are carried around the circuit of the mines on Panther Creek. On our return trip we were again drawn to Summit Hill, over an inclined plane. From this point we have before us a continuous ride of nine miles to the point from which we started to ascend Mt. Pisgah. The scenery on the route is grand, wild, and magnificent. Our car at times attained a great velocity, exceeding apparently that customary on trains run by locomotives.

Regretfully we left the car in which we had so much pleasure, and with one accord we vow to have that trip again. As we near the Mansion House, the dinner bell gives us its friendly greeting. After dinner a meeting was held in the parlor of the hotel, and resolutions of thanks to Messrs. WILDER, BARNEY, and ROGERS for their exertions and care, which had contributed so much to the happiness and comfort of their guests, were adopted. Resolutions complimenting the floor committee and the host of the Mansion House were also unanimously passed.

Steel-faced Rails.

WE reproduce the following letter on a subject of considerable interest at the present time from the London *Mining Journal*:

TO THE EDITOR: Sir—At the recent meeting of the Iron and Steel Institute there was a great deal of discussion as to obtaining uniformity of rails—that is, uniformity of section—and I suppose the members are now attempting to settle the matter among themselves. The chief object, I think, is to use the smallest possible weight of steel to produce a given effect, as the first cost of steel is so much greater than that of iron, so that although the durability of steel is admitted, there is still a great disposition to employ iron to avoid such heavy outlay. The opinion seemed to prevail at the meeting, that a rail somewhat of the double T section was likely to prove the best for the standard rail, but the bottom head to be so reduced as only just to give the necessary support without being suitable for turning. Indeed, if rails are properly laid, I doubt the economy of turning altogether, especially on the ordinary road not near the stations, for I believe that the interest on the cost of the mass of metal lying idle is greater than the saving effected by turning and using the turned rails. Because a turned rail is seldom like a new one, owing to the face that has been on the chairs being frequently much damaged by the continued concussion, and the longer the one face has worn the worse will be the condition of the other.

But what we have to find is the lightest form of rail, with a good head, and sufficiently stiff, and the section I should be inclined to prefer is that of the Vignoles rail, supposing the bottom flanges removed. If such a section constructed of steel were employed, with improved iron sleepers and chairs, I think the aggregate cost of constructing permanent way with steel rails would be less than it is at present with the ordinary double-headed iron rails. With steel rails of the section mentioned, there would be no difficulty in using the longitudinal plate sleepers proposed some years since, and which had the form of a bridge rail reversed, or very nearly so. The web of the rail would exactly fit into the groove of the sleeper, and these sleepers would be made in two-feet lengths for the middles of the rails, and four-feet lengths for the joints. The sleepers and rails-web should be keyed together, like ordinary rails and fish-plates, and tie-bars should be used to maintain the gauge. The sleeper would thus form chair and fish-plate, as well as sleeper proper, and a very smooth road would be made at the cost of the present transverse sleeper less than at present (taking the lowest estimate), and I think all the advantages sought would be attained. D. D. R.

Shaft Boring in Belgium.

Mr. WARRINGTON SMYTH, of the London School of Mines, recently read a paper on this subject before the Northern Institute of Mining and Mechanical Engineers. He alluded more especially to the method of KIND and CHANDRON. One object aimed at by this system of forming shafts for mining purposes is to avoid the preliminary expenses of boring, a very important consideration, as ordinary boring in many cases had been ruinous, and involved failure. The system, or similar systems, have been tried in many places, both in England and other countries, but Messrs. KIND and CHANDRON had succeeded where others had failed. In the case of two pits, to be sunk at a cost of 21,000*l.*, the first had been finished at 7500*l.*, and the company had been anxious in the first instance to enter into a contract for 40,000*l.* The most difficult and doubtful operations are, by using this method, converted into a comparative certainty. An economy of from 50 to 80 per cent. had been effected, as compared with the ordinary system; no pumping was required; the eruptions of quicksand were in a great measure prevented. In addition to all this, the work is done at the surface, and, therefore, the danger to life and limb is much less; a smaller number of men are required, and men not so highly paid as ordinary sinkers.

Horse Railroads in England.

A SECOND line of what the cockneys are pleased to call "street tramways" has been successfully operated in London for more than two months. The American system of low fares has also been introduced, and seems to meet with general approval and success. Many people are thereby induced to ride short distances, so that the passengers are changed three or four times during each trip. The Caledonian Railway Company oppose the bill before the House of Lords to establish such a railroad between Edinburgh and Leith, so that it is somewhat uncertain whether the people of the old Scotch capital will be permitted to enjoy the desired privilege.

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., WILLARD P. WARD, M. E., } Editors.

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THE SCIENTIFIC PUBLISHING COMPANY.

WILLARD P. WARD, MANAGER,

37 PARK ROW,

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The Morse Testimonial.

THE imposing celebration which accompanied the unveiling, on Saturday, the 10th instant, of the statue of SAMUEL F. B. MORSE, worthily emphasized the new era in the history of civilization which our distinguished American inventor was instrumental in producing. Full of years and of honors, Professor MORSE has lived to see the fruits of his genius and perseverance multiplied beyond all expectation, and to receive, in simultaneous chorus from all the continents, the thanks and admiration of his fellow-men. In his triumph all Americans are proud; and no one grudges him the gratitude, or the more substantial rewards, of which he has been the recipient.

The numerous orators of last week's celebration seem, however, to have forgotten the labors of other men, whose industry and scientific investigations made possible the invention of MORSE. Unfortunately some of the questions connected with this subject have been matter of bitter litigation, and many of the parties concerned have not yet lost the warmth of feeling which prevents a calm, impartial judgment. But we are glad to see that Professor MORSE himself, both in his speech last Saturday week at the Academy of Music, and in his report on Telegraphy in the series of the Paris Exposition, has acknowledged the merits of other and not less illustrious men.

The person most wronged in the controversies on this matter is, without doubt, Professor JOSEPH HENRY, Secretary of the Smithsonian Institution. It has always seemed peculiarly unjust that this eminent philosopher, who never had claimed pecuniary reward for his invaluable contributions to the science of electro-magnetism, should be robbed for years of the credit of his labors to satisfy the supposed necessities of a sharply-contested law-suit between other parties.

Tardy atonement is made in the report of Professor MORSE above referred to, in the following words:

"In the United States, as early as 1831, the experimental researches of Professor JOSEPH HENRY were of great importance in advancing the science of electro-magnetism. He may be said to have carried the electro-magnet, in its lifting powers, to its greatest perfection. Reflecting upon the principle of Professor SCHWEIGGER's galvanometer, he constructed magnets in which great power could be developed by a very small galvanic element. His published paper in 1831 shows that he experimented with wires of different lengths, and he noted the amount of magnetism which could be induced through them at various lengths by means of batteries composed of a single element and also of many elements. He states that the magnetic action of 'a current from a trough composed of many pairs is, at least, not sensibly diminished by passing through a long wire,' and he incidentally noted the bearing of this fact upon the project of an electro-magnetic telegraph (semaphore?). In more recent papers, first published in 1857, it appears that Professor HENRY demonstrated before his pupils the practicability of ringing a bell by means of electro-magnetism at a distance."

To the attentive reader this admission leaves as the invention of MORSE merely the system of signals and recording machinery which has received his name. He certainly devised the telegraph proper, that is, the means of writing at a distance; yet, even the MORSE machine is most frequently used as a semaphore, since skillful operators make no use of the paper, but read the sounds of the lever by ear.

This is the system mainly used throughout the world; and it is but right that its inventor should be considered the representative of the great gift of science to man which it first made conveniently available. "The father of the telegraph" he may well be called; though it were well to inscribe on the pedestal of his statue the names of some of the other ancestors of that promising child—GAUSS, WEBER, COOKE, WHEATSTONE, STEINHEIL, and HENRY.

Sulphur Mining.

IN another column will be found a communication from one of the directors of the Calcasieu Sulphur Mining Company, with reference to the present condition of the company's property and their plans for future working. We have already devoted considerable space to this subject, which we consider, in both a geological and an engineering point of view, to be one of great interest.

The discovery of native sulphur in workable quantities is a subject for congratulation to the political economist in a country obliged to import large amounts of that material for the manufacture of sulphuric acid. The questions naturally arise, How shall we mine this immense bed economically? and, secondly, How shall we beneficiate the sulphur after we have mined it? The first question has already been decided by the company, as will be seen from the letter referred to, and the second, though not less important, perhaps, still remains to be solved.

The system of shaft boring adopted by the company has been successfully employed in many places in Europe. Mr. KIND is an engineer whose reputation is based almost exclusively on the tools and method which he has been for years engaged in perfecting. The construction of the Louisiana shaft could not have been entrusted to abler hands. By their system of shaft boring *a niveau plein*, Messrs. KIND and CHANDRON have already sunk shafts four and a half metres (14 feet 7 inches) in diameter, and 148 metres (481 feet) in depth. The systems of DRU Brothers and of DEGOUSÉE and CH. LAURENT are also highly spoken of.

We recently obtained from an English mining engineer of extended experience and reputation, Mr. HENRY SEWELL, Manager of the Pacific Mining Company (limited) of Austin, Nevada, the promise of one or more articles on the methods of treating native sulphur practiced in Sicily and Spain. This gentleman has visited both countries, and is thoroughly acquainted with the processes employed, having been for five years personally engaged in sulphur mining in Spain. We are awaiting the arrival of these communications, which we think will not only be of interest to the engineering profession, but of intrinsic value to the Louisiana company.

We are also indebted to the same gentleman for a remarkable specimen of cinnabar found in a hematite iron ore mine in Spain, and which still shows the concentric striations peculiar to the kidney hematite, though the bulk of the specimen has been metamorphosed into cinnabar. The mine from which this specimen came yielded no quicksilver ore until a depth of nearly a hundred feet was reached. It is said to be a true fissure vein crossing the strata, and hence not to be confounded with the other quicksilver mines of Spain, which are merely lenticular masses conformable with the strata.

The Darwin Controversy.

THERE is certainly no lack of articles in periodical literature for and against the Darwinian hypothesis; but it is not easy for the reader of magazines to do in this case, what is frequently done in cases of cotemporaneous controversy, namely, discover from the statements of the reviewers what the dispute is all about. The trouble is, that neither side fairly states the position of the other. Only a week ago, a writer in one of the foremost religious journals of America adduced, as an illustration of DARWIN's theory of the origin of specific characters, the long neck of the giraffe *acquired by habitually stretching to feed on the top of trees*. This may be a fair description of the discarded theory of LAMARCK; applied to that of DARWIN, it merely reveals a total misconception of its first principle on the part of the critic. Even eminent writers like the Duke of Argyle have betrayed a strange incapacity to comprehend the exact nature and bearings of the hypothesis they deny; while, on the other hand, the Darwinians, it must be confessed, have usually stated the theories of their opponents in anything but a candid way, and have been content with demolishing fortresses already decrepit with age and weakness, and scarcely garrisoned any longer by the regular, disciplined forces of the enemy.

Fortunately for those who desire, without wading through the voluminous literature of the subject, to obtain a just notion of its meaning and merits, the books of Mr. DARWIN and a few others are characterized by great candor as well as clearness. We advise the student to peruse, first, Mr. ALFRED WALLACE's "Contributions to the Theory of Natural Selection"; second, DARWIN's "Origin of Species;" and third, the recent work of ST. GEORGE MIVART, "On the Genesis of Species." Next to these, some papers in HUXLEY's "Lay Sermons" may be profitably studied, and, if the reader has a taste for philosophical writing, HERBERT SPENCER's chapters on Evolution. The American public is indebted to the APPLETONS for the republication of all the works mentioned, except the first, in a style which makes their perusal a pleasure, and at a price which makes their purchase no burden. The same house has issued in two handsome volumes DARWIN's latest work, "The Descent of Man," and BRENTANO has republished in a small pamphlet ALFRED WALLACE's review of it, which originally appeared in the *Academy*. These materials are sufficient to give the intelligent reader the means of forming a judgment of the present position of the great question which has agitated the scientific world for nearly a dozen years. It is not too much to say, that the works named ought to be in the library of every man who desires this important subject to be represented among his books; and we venture to add, that by means of them, it will be adequately represented for all the purposes of the general reader, though, of course, the professional investigator will require a larger range.

Mr. MIVART's book is in many respects the ablest which has appeared in opposition to the Darwinian theory. It does not deal specially with the "Descent of Man" (which, indeed, was published but little, if at all, before it); but it strikes at the root of the hypothesis of the origin of species by natural selection. Before briefly describing the nature of Mr. MIVART's argument, let us endeavor to epitomize the position of Mr. DARWIN, as shown in the latest editions of his works.

There are three main lines of positive argument, supporting DARWIN's hypothesis. The first (in logical order, though not in his book) is drawn from the mutual affinities, or morphological and embryological resemblances of organic beings, and may be roughly summed up in the proposition that the grouping of organisms in the vegetable and animal kingdoms, according to their specific, generic and other characters, is such as to indicate their origin from common pre-existent forms, by descent with modification, and to reasonably exclude the theory of special creations of species. The second is drawn from the geographical distribution of plants and animals; and the proposition is, that the phenomena of this distribution, though difficult, by reason of our ignorance of the changes that have taken place on the earth, to explain on any theory, are quite inexplicable on the ordinary view of the independent creation of each species, and harmonize more readily with the theory of descent, colonization and modification.

Now these two arguments support any theory of the origin of species by descent as well as DARWIN's. The third, however, is peculiarly his own. It is drawn from the facts of variation and heredity in organisms, and particularly from the knowledge of those facts experimentally acquired in horticulture and "fancy" breeding. The proposition is, that Nature breeds species (or, more accurately, species breed themselves) by a process similar to that which man employs in producing and perpetuating varieties. Analyzed into its main elements, it presents the following series of general propositions:

1. All species tend to increase in geometrical progression.

2. The normal results of such an increase do not appear. The number of individuals of any species (plant or animal) in a given region remain practically stationary, unless affected by the agency of man.

3. Hence we must infer that the majority of individuals suffer premature death—*i. e.*, die before producing their normal amount of offspring.

4. Whatever are the causes producing death (severity of climate, lack of food, natural enemies, etc.,) it is evident that, in the long run, those individuals which are best protected against such causes will survive, and produce offspring.

5. Since no two individuals are exactly alike, some are certain to be better protected than others.

6. Since parents transmit to their offspring a general likeness, with individual differences, the peculiarities which protected the parents are likely to be reproduced in the next generation; and this generation being exposed to similar perils, the best protected individuals will again survive, and transmit to their offspring the protecting peculiarities, intensified; and thus, by "natural selection," or what SPENCER has happily termed "the survival of the fittest," a general specific form is acquired and maintained, so long as the conditions of life remain unchanged.

7. But conditions are perpetually changing; and hence, especially through climatic, topographical and geological alternations, new forms are continually developed by natural selection. These we group as species, genera, etc.

Mr. DARWIN admits that natural selection has not been the sole means of modification, though he still contends that it has been, among plants and most animals, the most important one. In his "Descent of Man," he has recourse to a new and very different agency, namely, sexual selection, or the propagation and intensification of certain otherwise inexplicable peculiarities by the choice (whim) of one or both of the parents. It must be admitted, that this latest book is not only less convincing than the former ones, but that the total break-down of natural selection which it confesses tends to shake our faith in the confident conclusions of the author with regard to the dynamic value of that agency outside of man.

It must be remembered that Mr. DARWIN was hurried by circumstances (chiefly the independent discovery of his theory by his friend, MR. WALLACE,) into what he considered a premature publication of his views. It is not surprising, therefore, that his successive volumes show, to some extent, the processes of his own mind, which might otherwise have preceded the announcement of his views. His transparent honesty and loyalty to science are not the least of his great qualities, and lead him to make concessions which vainer and weaker men would avoid. It may be said that the germ of almost every argument against his theory may be found in his own writings. He may have erred in balancing conflicting facts; he has never committed the sin and folly of ignoring them.

Mr. ST. GEORGE MIVART says of his book "On the Genesis of Species":

"It is its object to maintain the position that 'natural selection' acts, and, indeed, must act, but that still, in order that we may be able to account for the production of known kinds of animals and plants, it requires to be supplemented by the action of some other natural law or laws as yet undiscovered. Also, that the consequences which have been drawn from Evolution, whether exclusively Darwinian or not, to the prejudice of religion, by no means follow from it, and are, in fact, illegi-

timate. * * * What is to be brought forward may be summed up as follows:

"That 'natural selection' is incompotent to account for the incipient stages of useful structures.

"That it does not harmonize with the co-existence of closely similar structures of diverse origin.

"That these are grounds for thinking that specific differences may be developed suddenly instead of gradually.

"That the opinion that species have definite, though very different limits to their variability is still tenable.

"That certain fossil transitional forms are absent, which might have been expected to be present.

"That some facts of geographical distribution supplement other difficulties.

"That the objection drawn from the physiological difference between 'species' and 'races' still exists unrefuted.

"That there are many remarkable phenomena in organic forms upon which 'natural selection' throws no light whatever, but the explanations of which, if they could be attained, might throw light upon specific origination."

We have purposely refrained from considering either the Darwinian hypothesis of "pangenesis," (put forward to account for the facts of variation and heredity,) or Mr. MIVART's criticisms upon it. That hypothesis is an almost purely speculative matter, not essentially connected with natural selection, except that it is the fancied cause of the facts of which natural selection is the result. It is what TYNDALL has charitably called an instance of "the scientific use of the imagination."

The plan above sketched has been executed by Mr. MIVART with equal grace and force. His book is delightful, as well as instructive reading. It is true that HERBERT SPENCER long ago pointed out the limitations of natural selection; but they have never before been discussed so fairly, fully and clearly for the benefit of the general public. Apparently, the scales of controversy are, by this weight, restored to a more nearly equal balance. Mr. DARWIN has found his match in honesty, earnestness, and logic, if not in detailed knowledge of facts.

We hear not unfrequently from the pulpit and the desk, that Darwinism is "dead." Superficial observers, seeing or hearing that the original hypothesis of natural selection has been in part overthrown, imagine that the whole theory of Descent or Evolution has sustained final defeat, and that the antagonist theory of Special Acts of Creation has been re-established on firmer foundations than ever. Nothing could be further from the truth. MIVART, who denies the exclusive agency of natural selection—WALLACE, who denies its application in the development of Man—COPE and HYATT, who substitute for it another law, at least in the origination of genera—in fact, all writers who have successfully opposed it, in whole or in part, are firm believers in the origin of species by descent from pre-existent forms. The defeat of Darwinism (if it be a defeat) does not restore to authority the doctrine of independent and disconnected creations. The theory that organic forms have been developed successively according to natural laws is more strongly supported to-day than ever before. Even the common ancestry of men and apes, so far as the animal nature of man is concerned, does not fall when DARWIN's attempt to explain the *modus operandi* fails.

The sooner theological teachers apprehend this fact, the better for theology. Mr. MIVART's chapter on "Theology and Evolution" will be a timely help for those religious teachers who realize the necessity of occupying a new and tenable position. Even reverence for authority (usually not much regarded by scientific writers) may be satisfied by his interesting demonstration that AUGUSTINE, THOMAS AQUINAS, and SUAREZ, three great Christian philosophers, representing the three great ages of the Church—the primitive, the mediæval and the modern—promulgated the doctrine of "derivative creation."

In fine, this book illustrates the advantage of familiarity with the two aspects which all truth presents. Specialists on both sides have presented their partial views, and seemed to stand in irreconcilable antagonism. Mr. MIVART, combining the two, shows how easily they blend and harmonize—a work which fairly earns for him the thanks of all sincere followers of the truth.

The Sulphur Mines of Louisiana.

NEW ORLEANS, June, 1, 1871.

Prof. S. D. TILLMAN: *President Polytechnic Club, of the American Institute.*

DEAR SIR:—Having observed in THE ENGINEERING AND MINING JOURNAL, of the 23d May, 1871, a report of a discussion, relative to the sulphur mines of Louisiana, had at the American Institute, March 16, 1871, I beg to submit a few facts, which may have an important bearing upon the questions there presented.

The statement of Dr. VAN DER WEYDE, that "the sulphur is found four hundred feet under water," must be taken with some limitations. If he meant to say that the sulphur lies four hundred feet below the level of the sea, it is correct—if he meant, that all of the several strata, overlying the sulphur, were thoroughly permeated with water, the statement is incorrect.

A section, made by Prof. HILGARD, of the first artesian well sunk upon the grounds, is correctly described in THE ENGINEERING AND MINING JOURNAL of the 28th March, 1871, from which it will be seen, that the first 163 feet below the surface consist of yellow and blue clay, soaked with petroleum. The two experimental borings which have been made, prove that the clay contains little or no water. In view of this fact, the Calcasieu Sulphur and Mining Company propose to put down a temporary shaft of wood, through the clay, because there will be little or on obstruction from the water. Below this depth, however, all the strata contain more or less water; and especially the limestone, from which the water rises with such force as to form an artesian well, flowing through a four-inch tube, about sixty-five gallons of water per minute. Engineers of experience assure us, that even this flow of water will not prevent the sinking of a shaft successfully to the sulphur, upon the plans usually adopted, in mining for coal or copper.

But the difficulty of shafting through water-bearing strata has been fully appreciated by the Board of Directors of the Calcasieu Sulphur and Mining Company; and they have, in consequence, adopted the new system, patented by Messrs. KIND & CHANDRON, of Belgium, who by their boring process, *a niveau plein*, have succeeded in sinking and lining two shafts of cast iron in Prussia, about the year 1860, after previous attempts to sink a shaft at the same place upon the old plans had proved unsuccessful, and failed in consequence of the watery and difficult ground to be penetrated. By this plan the shaft is put down while the well is full of water, and is pumped out after the shaft has reached the desired stratum, and made secure at the bottom from the influx of waters from above. A description of this invention, and diagrams of the tools and machinery employed, will be found in Mr. D'ALIGNEY's Exposition Report of 1867, and also in that valuable work, "Mining Statistics West of the Rocky Mountains, 1870," by R. W. RAYMOND, Esq., of your city. The Board of Directors have secured the assistance and counsel of Mr. CHANDRON, and the shaft has been constructed in Europe under his supervision. A portion of the shaft and the machinery are now on the way to the mines, and we all, directors and stockholders, feel assured that we will sink a cast-iron shaft to the sulphur bed, 428 feet below the surface, 10 feet in diameter, in much less time, and at much less cost, than the old method of sinking mining shafts. The system of Messrs. KIND & CHANDRON has been demonstrated within a few years past to be a success in North-East France, and near Saarbruck, in Prussia; where the depth to be reached was greater, the strata penetrated much harder, and the pressure of water no less, than at the sulphur mines in Calcasieu, Louisiana.

The next question discussed at the Institute was, whether, after the sulphur has been reached, it would be necessary to brace up the overlying stratum with timbers, which would seriously augment the cost of mining the sulphur, and might place it, like the lignite in New Jersey, beyond the reach of profitable working.

By referring to the section of the experimental borings above mentioned, you will observe that the sulphur lies under a bed of limestone rock, eighty-one feet thick. This would afford a permanent roof to cover mining operations below, without the use of bracing timbers, were it not for the fact that about forty-one feet of the lower portion of this limestone ledge consists of "crumbling limestone," having much of the appearance and consistency of ordinary rock-burnt lime. It was found to afford a tolerably permanent wall, without tubing, to the drill-hole, made by the auger in boring the artesian wells; but yet it may not be sufficiently self-supporting to render mining operations beneath it safe, without bracing. This can only be ascertained by actual experiment.

But in both of the experimental borings the upper portion of the sulphur strata was found to be in a crystalized form, and, where not entirely pure, surrounded and mixed with a calcareous matrix, hard and solidified, so that the top crust of the sulphur (if I may so express it) will form a roof as secure as if made of the limestone rock itself. It is the opinion of the engineers that ten feet of it in thickness, reserved, will be amply sufficient; and that will give a full one hundred feet of sulphur to be mined below.

Those problems were proposed, discussed, and worked out before the Calcasieu Sulphur and Mining Company was organized; and the large capital, so liberally subscribed and so cheerfully paid in by instalmen , is ventured upon the united judgment of the best engineering talent both in this country and in Europe, that all opposing difficulties can be readily overcome, the work prosecuted to a speedy success, and that the enterprise must yield enormous profits to the shareholders.

Permit me here to state that no sulphur has as yet been found in the State of Louisiana, except upon the lands of the Calcasieu Sulphur and Mining Company. But one other experimental boring has been made outside the limits of the Company's lands, and that has been made upon the lands of the Petroleum and Mining Company of Louisiana, better known as Dr. KIRKMAN's well, a section of which was also given in Prof. HILGARD's REPORT. This artesian well was sunk at a distance of about half a mile, and in a north-west direction, from the works of the Calcasieu Sulphur and Mining Company. It has gone down to the depth of more than 450 feet below the surface, lower than the level of the sulphur deposits; but no indications of sulphur, nor even of the superincumbent limestone rock, have as yet been found. Whether the sulphur deposits do not extend in that direction, or lie deeper; whether they are local in their character, or whether they spread horizontally under the surface, and how far, are questions to be determined, in the future, by actual experiment. But up to the present moment the energy and enterprise of the owners of surrounding lands have failed to discover the mineral in any other locality.

I beg you to excuse the liberty I have taken in addressing you. My only object is to give information as to facts, and if you should desire any other information respecting the Calcasieu Sulphur Mines, I will take great pleasure in communicating such as may be in my possession.

Very respectfully, W. B. KOONTZ.

Mining Legislation in Pennsylvania.

DRIFTON, Jeddo P. O., Pa.

TO THE EDITOR: Sir—The attention of our mining population and of the public at large has again been called to the vital necessity of proper legislatio upon the subject of mining by the fearful accident which has just occurred at West Pittston. In a paper, read before the American Social Science Association in Philadelphia last autumn, I offered some suggestions as to the best method of obtaining the desired object; but, as many years will probably elapse before any systematic effort will be made to draw up a well-digested code of mining laws, I would like to call attention to a simple amendment to the Pennsylvania Ventilation Act, by which not only the responsibility would be placed, in case of accident, upon those to whose negligence the disaster was due; but also such terrible calamities would in many cases be prevented.

Every coal-operator should be compelled to provide a book to be kept at the works, in which it should be the duty of the inspector, after each examination of the mines, to enter the date and time of day of his visit, the state of the ventilation, with the amount of air passing through the workings, and the general condition of the mines. If he should observe, while making his inspection, anything which might possibly compromise the safety or health of the miners, it would be his duty to note it, with the proper remedy, upon the register. When the entry was completed, he should sign it, and take a copy of it in his note-book. Before proceeding to inspect a mine, he should call for the register, and read over the notes made at his last visit; and he should be very careful, while in the mine, to see that the directions given previously had been obeyed. In this way he would know exactly to what points he should direct his attention. There are three great advantages to be gained by adopting the above suggestion.

In the first place, the operator would know exactly and officially what he was required to do, and would be much less likely to neglect a direction given in writing, and placed upon record, than one given verbally to the mine-boss, while he is passing through the works with the inspector, and talking of perhaps twenty different things.

In the second place, the inspector, knowing before entering a mine the principal causes of danger in it, would be able to concentrate his attention upon the points of greatest importance, and to see that the directions given by him during his previous visit have been complied with. If such should not be the case, he would note the fact, and again call attention to the danger and to the proper remedy. An inspector, who visits perhaps fifty different mines, needs some such memoranda to recall the particular dangers of each mine.

In the third place, when an accident occurred, there would generally be no difficulty in placing the responsibility upon the person to whose negligence it was due, if there were any one to blame, for the register would show whether the inspector had visited the mine often enough, and whether he had called the attention of the operator to the dangers to which the men were exposed, and had ordered him to provide against them; on the other hand, if the inspector had done his duty, the book would show at once that the operator had had warning, and had neglected to take the proper precautions to prevent the calamity.

As both parties would have a copy of the entries made by the inspector after each visit, there would be little danger of the register disappearing after an accident.

A simple amendment, compelling each operator to keep such a record, and the inspector to enter upon it after each visit, his advice in regard to the management of the underground workings could easily be added to our present mining law, and would, I feel satisfied, do more to prevent accident than any other change, which could be made without remodeling the Ventilation Act. Hoping that an earnest endeavor will be made by those interested in the question to procure such an amendment when the Legislature meets,

I remain, very truly yours, ECKLEY B. COXE.

Mining in Colorado.

GEORGETOWN, COL., June 3, 1871.

TO THE EDITOR: Sir—The present season bids fair to be above the average in real progress in mining and milling throughout this section, at least, of Colorado.

The bullion product may not largely exceed that of last year, owing to the fact that considerable dead work is being done in the mines; but these developments will insure a large increase for years to come. There are on every hand signs of healthy life, and some almost forgotten districts, that have been dead, or very near it, for years, begin to show symptoms of returning vitality. Empire gold district is a case in point. It has large veins that can be easily and cheaply worked, cheap fuel, plenty of timber, abundance of water and water-power; and can probably mine and mill ores at less cost per ton than any other district in the territory. The ores are generally of low grade, but, with economical management and proper handling, ought to pay.

The mistakes and errors of an earlier day can now be in great measure avoided, and the bitter lesson of the past has taught economy.

I visited, a few days since, the works of Prof. DIBBIN, located among the mountains, seven miles south-west of Georgetown. He uses the Bruckner cylinder, ball pulverizer, and barrel amalgamator. Capacity of mill, about four tons per day. These works are remarkable on account of their lofty situation, being just below the timber line, the average height of which is over 11,000 feet. The mines that furnish this mill are, I should judge, 1,000 feet above the timber line. I visited only two, the International and Belmont. The first has a tunnel in about 250 feet; ore rich, and vein generally of good size, but irregular, and without well-defined walls. The Belmont has three tunnels on the vein, the deepest being 400 feet. The vein is pretty well defined, and in some places has true regular walls. Ore is of good quality.

Quite a sensation was created last fall when it was announced that a party of reckless savans were going to winter on Mount Washington, and all that they saw, and felt, and did was chronicled with great minuteness. It was the next thing to a trip to the Pole. Well, here were *honest miners* on the Bel-

mont, working day by day, the winter through, at almost twice the altitude of that New England knoll, and yet they never even got their names in the papers. It is moderately cool up there, too, as may be inferred from the fact that the earth is now frozen solid where they are driving on those lodes at depths from the surface of 120 to 140 feet. Is not this a remarkable case of frost penetration? F. W. C.

Tin in Australia.

A VALUABLE tin lode, superior to anything heretofore found in the district, is reported, according to the Ovens *Advertiser*, to have been discovered in the neighborhood of Eldorado. The precise locality of the discovery is a range at the head of Clear Creek, about two miles above the ground leased by Mr. R. D. REID for tin-mining purposes. The reef or lode, so far as traced, is very distinct, running between walls of solid granite. It is about five feet wide, and has been struck in two trenches, put in about twenty-five yards apart on the face of range. Tin abounds on the surface, and is also plainly visible in the stone, a kind of disintegrated granite. A quantity of black sand found at the Moe, near the Tangil cement diggings, was some time since sent to Mr. JOHNSON, the Government analytical chemist, for examination. According to a local paper, that gentleman, when in Sale, a short time since, assured the district surveyor that the sand, upon analysis, proved to be almost unprecedentedly rich, containing from thirty to forty per cent. of tin.

Result of Centuries of Culture.

THE successive editions of WEBSTER'S "Unabridged" are as perennial in interest as in value. Each successive reprint finds the work of our great lexicographer still unrivalled among English dictionaries. In each republication we likewise find a mirror of the scientific progress of the age, a sleepless vigilance which nothing escapes, to catch every new shade of verbal significance, and to retain for our unapproached standard of language that freshness which preserves it from ever becoming old. In the 1840 pages before us there are compressed the *results of centuries of culture* and the sum of the intellectual contributions of some of the greatest minds of the race. Whether regarded as a whole, or in detail, the book is equally marvellous. Its illustrations are copious, appropriate, and carefully executed. The matter in the appendix is of a character indispensable for reference to all who read and to all who write with serious purpose. The book is, in short, one which neither school nor study, library or office, ought to be without.—*New York Times.*

Explosive Burning Fluids.

THE Fire Inspector of Baltimore has recently made his annual report to the Councils of that city, in which he calls their attention to the necessity of the passage of an ordinance, by which the citizens may be protected from the dangerous illuminating fluids that are sold, and warranted non-explosive. An analysis of these fluids was presented, from which it appeared that the most volatile specimen was of a specific gravity of 0.68425, and the least volatile of a specific gravity of 0.71605, while the specific gravity of good kerosene is 0.79528.

DURING the year 1870 seventy boiler explosions took place in England, by which 85 persons were killed and 138 wounded.

DEPARTMENT OF POPULAR SCIENCE.

The Sense of Feeling.

THE other day, Madam, we had a conversation on the subject of our noses. That is, I call it a conversation, though I did most of the talking. But that is a way I have unfortunately acquired; and it is perhaps not disagreeable to you *for a change!* At all events, since you do me the honor to ask if I will favor you with some more of my highly scientific discourse, I shall assume that you like to listen.

You burnt your finger just now, trying to snatch a moth from the candle-frame. That suggests the subject of the sense of feeling or touch, which this incident has called into lively activity. While you occupy your mouth in sucking the tip of your finger, I will occupy mine in a learned explanation of your anguish.

What are our senses?—I beg your pardon, I have made a mistake, and asked a question which I cannot answer, a thing which no philosopher can afford to do. The best definition I can give is, that the senses are the medium of sensation—which sounds slightly tautological. Yet this vague realm of sensation constitutes all that we know of the material universe. All the qualities of external things, as we perceive them, are sensations of our own, and ideas or conceptions based thereon.

For instance, you say that the roses on your table are red; but the color is all in your eye. Sugar, you say, is sweet; but the sweetness (no mere compliment intended, madam!) is all your own. The strings of your guitar do not sound, they merely vibrate; and if they vibrated with nobody to hear, they would be silent. What is the quality in the rose which the light interprets and your eye reads, as color; what is the reality in sugar which corresponds with sweetness in your taste; how the vibrations of string and air speed silently until, touching your delicate ear, they start into music—these are matters concerning which we talk much and know little. Yet science has at least succeeded in clearing the field of a good deal of rubbish, and showing where the mystery lies hidden, which perhaps will never be unearthed.

You must get rid, then, first of all, of the notion that the qualities of sensation are the qualities of the object causing sensation. Strictly speaking, when we attribute a certain quality to something outside of ourselves, we mean only that it produces in us a certain sensation or idea.

The perception of an object is a representation which the mind forms from the sensation by the help of certain recognitions or associations derived from experience. It is probable that babies have not even a consciousness of the part of the body which receives pleasurable or painful sensations. Perhaps you never thought, while rapidly hunting for the locality of the unknown pin which was tormenting your vociferous (though angelic) infant, that while you don't know where the spot is, the baby is equally ignorant. He has to be tickled and hurt a great many times, before he learns what place on the outside of him corresponds with the sensations roused inside. In fact, to the five senses of sight, hearing, smell, taste and touch, which are perhaps born with us, we must add by practice a sixth sense of locality, before any of them will be good for much. It would be interesting to inquire how this sixth sense originates and developes itself; but we will skip that subject for the present, and talk more particularly of the sense of feeling.

We cannot describe a feeling except by appealing to experience. If an individual who had never felt pain should ask you how your finger felt at this moment, you could answer in one way only—by sticking his finger into the candle. That would be conclusive; because there is no room for reasonable doubt that everybody feels burnt when he *is* burnt. Yet, after all, it might not pain him so much as it does you; and this ultimate, subtle difference in sensitiveness extends through the physical, mental and moral department of consciousness. Folks are like pianos, some loud, some unruffled, some out of tune, yet having, on the whole, a common pitch, range and relation of tones.

Appealing, then, to the average experience of mankind, we divide physical feelings into sensations of pain, tickling, shuddering, pleasure, hunger, thirst, pressure, heat and cold. This category probably includes all the sensations we can distinguish. It is true, we speak of boring, picking, tearing, stinging or burning pain; but it is probable that pain has but one quality, and that these imagined varieties result from differences in its duration and intensity, or combinations with other sensations, such as pressure and heat.

The sensation of pleasure, perhaps, ought not to be included in the list. It may be that pain and pleasure differ in degree only, as do heat and cold. But we will not be too refined in our distinctions.

These sensations cannot be defined; but it seems fair to divide them into two classes, the first of these including pressure and temperature, constituting the sense of touch proper, and being capable of association with ideas; while the second, comprising pleasure, pain, tickling, hunger and thirst, may be designated as common feeling, or isolated sensation. Thus, for instance, one is never able from internal sensations, to form any idea of the interior structure of the body. A man might have the stomach-ache for a hundred years, without getting any conception of the shape of his stomach. This is one reason, by the way, of the difficulty which people have in describing their symptoms to the doctor.

The sensations of pressure and temperature, together with the associated sixth sense of locality, enable us to appreciate the relation of external things which we call weight, form position, resistance, heat and motion. Of course our other senses take part in some of these perceptions; but the "common feeling" of itself does not assist us. Indeed, it may overpower the sensation of touch, so as to defeat its inquiries. Thus, no one would be likely to ascertain the form, weight, or even temperature of a piece of red-hot iron, by the direct use of his fingers.

But, in order to get a clearer notion of these distinctions, it will be necessary to go a little deeper into the nerves—a piece of figurative surgery, Madam, which I will postpone, out of consideration for your comfort, to another occasion.

R. W. R.

Eggs.

ANY one who eats three or four eggs at breakfast, consumes that number of embryo chicks. All the materials which enter into the legs, bones, feathers, bill, etc., of the new-born chick exist in the egg, as nothing is derived from outside. The little creature which has just pecked his way out of his calcareous prison-house, has lime and phosphorus in his bones, sulphur in his feathers, iron, potash, soda, and manganese in his blood, all of which mineral constituents came from the egg, and are taken into the stomach when it is eaten as food. The valuable or important salts are contained in the yolk, and hence this portion of the egg is the most useful in some forms of disease. A weakly person, in whom nerve force is deficient and the blood impoverished, may take the yolks of eggs with advantage. The iron and phosphoric compounds are in a condition to be readily assimilated, and although homeopathic in quantity, nevertheless exert a marked influence upon the system. The yolks of eggs, containing as they do less albumen, are not so injuriously affected by heat as the white, and a hard-boiled yolk may be usually eaten by invalids without inconvenience. The composition of a fresh egg, exclusive of the shell, may be presented as follows:

Water	74	parts
Albumen	14	"
Oil or fat	10.5	"
Mineral salts	1.5	"
	100	

The whole usually weighs about a thousand grains, of which the shell makes a tenth part. The chick-making materials, exclusive of water, form only one quarter of the weight of the liquid contents, or only about 200 grains. This seems to be a small beginning upon which to rear the full-grown rooster. The bulk or quantity, as found in hens' eggs, and indeed in the eggs of all birds, is wonderfully disproportionate to the size of the mother bird. The laying of eggs must be regarded as a particularly exhausting process, and yet fowls will keep it up for a long time and not lose much in flesh. We have a hen of the *game* variety, which has this spring laid 22 eggs in 22 consecutive days, and they average in weight 1,000 grains each. This gives in amount 22,000 grains, or rather more than three pounds avoirdupois, of which about two and a quarter pounds is water. The dozen or more ounces of rich nutritive material, parted with in 22 days, would seem to be a prodigious draught upon the small physical structure of the bird, but there were no indications of exhaustion.

Whilst it is true that the quickening of an egg which results in the birth of a chick, is no more marvelous a process or result than the embryotic development of any creature endowed with the mysterious principle of life, yet there are some circumstances connected with it which make it a matter of greater perplexity and wonder. Here is an oval white body consisting of a calcareous shell, within which there are some semi-fluid substances, consisting mainly of albumen and water, without any signs of life. In fact there is no life; it is simply a mass of dead inanimate matter. Talk as much as we will about the germinal principal involved in the structure of the egg, we are totally unable to recognize it, or form any conception of its nature. There is no evidence of the presence of any germ, or principle of life whatever. The egg left to itself decays like other organized substances, but with our assistance in simply transferring it to a place where the temperature is kept in a certain uniform condition, in a few weeks the albumen, water, oil, and mineral salts are transformed into a living chick, which thrusts its little beak through the shell, and in ten minutes is running about almost able to take care of itself. Here is the development of life apparently without the agency of the mother, and what a marvel! The chemist may place together in a body, in a warm place, just such elements or substances; he may carefully weigh the water, the albumen, the phosphatic compounds, the sulphur, the iron, soda, etc., and construct a very accurate egg mixture, but out of it all there will never come a living chick. In this we obtain some idea how little we actually know about *life*, how dark is the region where the life principle begins, or where the vital forces originate. The indefatigable man of science has pushed his inquiries close up to the boundary between the inanimate and the animate, but he has never been able to obtain the least glimpse of anything upon the *life* side of the line. However great may be our curiosity, our skill, or knowledge in this state of existence, there is not the least probability that we shall ever be able to endow matter with life, or know much more than we do at present of its origin or nature.—*Boston Journal of Chemistry.*

SOME of our readers who have lived fifty years may be glad to know what they have accomplished in that time. According to a French statistician, the average man has, at that age, slept 6,000 days worked 6,500 days, walked 800 days, amused himself 4,000 days, spent 1,500 days in eating, and been sick 500 days. He has eaten 17,000 pounds of bread, 16,000 pounds of meat, and 4,600 pounds of vegetables, fish, etc., and drank 7,000 gallons of liquids. There are 18,250 days in a half century, and from the above statement it would seem that a man slept just one-third of the time.

IN the museum at Cassel, Germany, is a library made from 500 European trees. The back of each volume is formed of the bark of a tree, the sides, of the perfect wood, the top, of young wood, and the bottom of old. When opened, the book is found to be a box, containing the flower, seed, fruit, and leaves of the tree, either dried or imitated.

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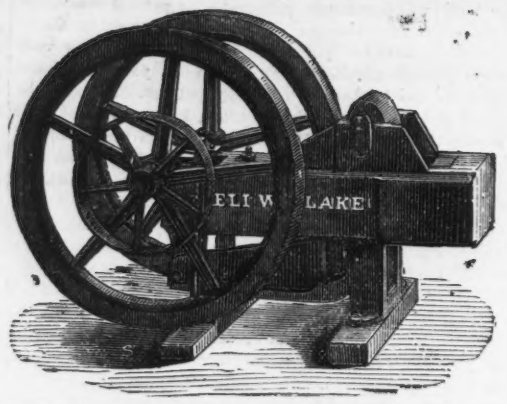

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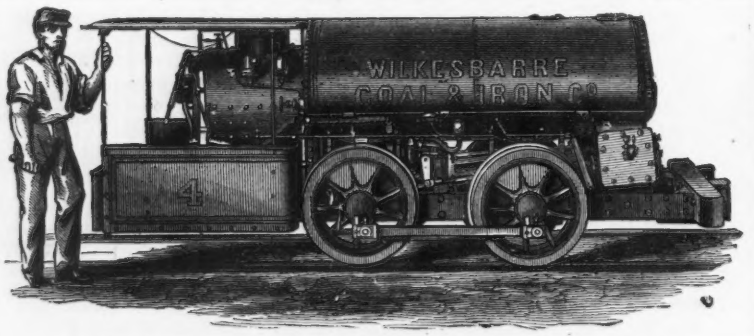

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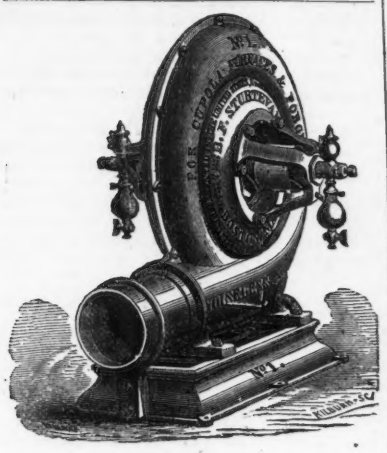

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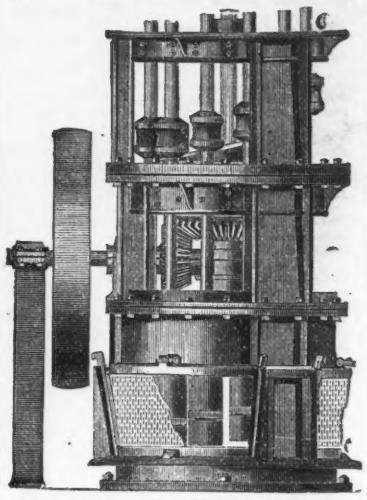

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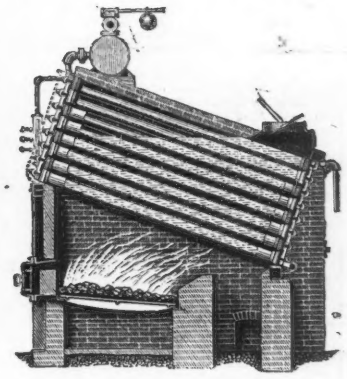

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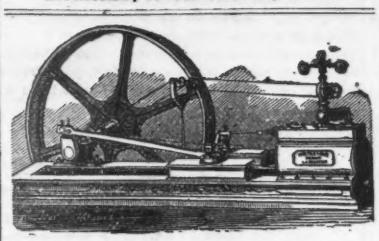

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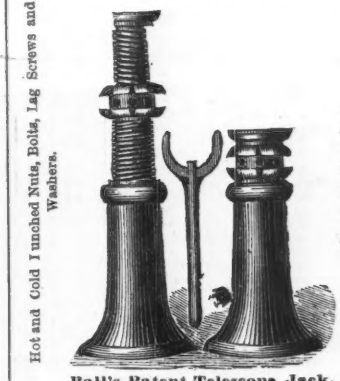

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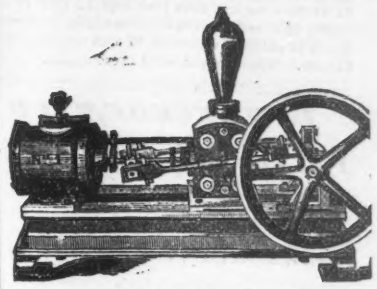

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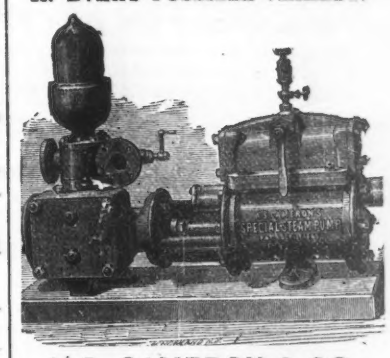

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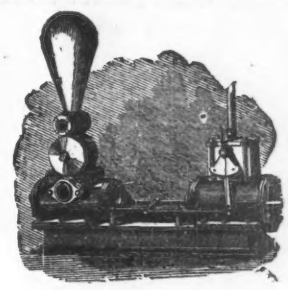

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	FROM THE STANLEY RULE & LEVEL CO.			
99	Boxwood two-foot Rule	2 50	6	25
100	Silver-Plated Triangular Drawing-Scale	6 00	16	52
101	Pocket Sheet-Metal Gauge	5 00	13	37
102	Arkansas Oil-Stone	1 75	5	22
103	Arkansas Oil-Stone, mahogany case	3 25	8	30
104	Gear or Cog-Wheel Calculating-Rule	4 00	12	36
	WESTERN & COMPANY'S AGENCY.			
105	Preparing and Filing a Caveat	25 00	28	80
106	Application for a Patent	30to40	35	100
107	Application for Patent and first Government fee	46to56	50	150
108	Application for Patent and all Government fees	66to76	75	250
	FROM J. W. HUTCHINSON.			
109	English Breech-loading double-barrel Gun	100 00	110	350
110	English Muzzle-loading double-barrel Gun	75 00	85	250
111	Breech-loading Rifle, the Allen	30 00	46	150
112	Revolver, Smith & Wesson's, No. 1½	12 50	19	65
113	Revolver, Smith & Wesson's, No. 2	15 00	22	75
	FROM MASON & HAMLIN.			
114	Melodeon, portable, No. 1, 4 octave	50 00	66	200
115	Melodeon, resonant, style G, 5 octave	170 00	146	510
116	Pipe-Organ, church use, style No. 29	675 00	579	2000
	FROM J. S. & C. ODELL.			
117	Pipe-Organ	500 00	430	1500
118	Pipe-Organ	700 00	600	2100
119	Bradbury Square Piano-Forte, No. 4	650 00	430	1500
120	Steinway's No. 1 Grand Piano	1200 00	860	3000
	THE AMERICAN WATCH CO., WALTHAM, MASS.			
121	Silver Watch	20 00	32	100
122	Silver Watch	35 50	48	142
123	Gold Watch	50 00	65	200
124	Lady's Gold Watch	100 00	110	350
	FROM THE UNITED STATES WATCH CO.			
125	Silver Watch	40 00	50	150
126	Silver Watch	66 00	75	275
127	Gold Watch	100 00	100	300
128	Silver Watch	104 00	104	312
129	A Sewing Machine (your choice)	65 00	65	200
	FROM MCALLISTER.			
130	Microscope and 48 objects	10 00	14	40
	FROM COLBY BROS. & CO.			
131	Velocipede for Boys	16 00	16	52
	FROM MCALLISTER.			
132	Magic Lantern, No. 433	20 00	30	95
	FROM H. THOMPSON.			
133	An Easy Chair			
	FROM D. APPLETON & CO.			
134	New American Cyclopædia, 16 vols.	80 00	80	213
	FROM G. & C. MERRIAM.			
135	Webster's Unabridged Pictorial Dictionary	12 00	15	45
136	Webster's National Pictorial Dictionary	6 00	10	35
	FROM WESTERN & COMPANY.			
137	One back vol. Manufacturer and Builder, unbound, post-paid	1 75	6	25
138	Two back volumes Manufacturer and Builder, unbound, post-paid	3 50	11	37
139	One back vol. Manufacturer and Builder, bound, post-paid	2 50	9	32
140	Two back volumes Manufacturer and Builder, bound, post-paid	5 00	18	58
141	Cover for binding the Manufacturer and Builder, post-paid	60	3	21
142	A $10 Library (your choice from list in special sheet), *All paid through by mail or express.*	10 00	18	58
143	A $15 Library, "	15 00	24	85
144	A $20 Library, "	20 00	31	106
145	A $25 Library, "	25 00	38	125
146	A $30 Library, "	30 00	44	144
147	A $35 Library, "	35 00	50	162
148	A $40 Library, "	40 00	56	177
149	A $45 Library, "	45 00	62	192
150	A $50 Library, "	50 00	68	207
151	A $60 Library, "	60 00	80	237
152	A $75 Library, "	75 00	100	282
153	A $100 Library, "	100 00	125	360
154	A choice of good Books (see terms in another column)			
155	A choice of convenient Book-Cases (see special sheet)			
156	A choice of popular Music (see terms in special sheet)			
157	A choice of Games and Toys, (see terms in special sheet)			

We have taken especial pains to select in making up our price list the NEWEST and very BEST articles. No charge will be made for boxing or packing any article on our list. The Premiums, Nos. **4** to **7** inclusive, **31** to **35** inclusive, **75** **99, 101, 105** to **108** inclusive, **121** to **128** inclusive, **137** to **141** inclusive, **154, 156, 157,** will each be delivered FREE of charge by mail or express (at the Post-office or express office nearest recipient) to any place in the United States or Territories. The other articles cost the recipient only the freight after leaving the manufactory of each, by any conveyance specified.

As an aid to those who engage upon large clubs, we will count subscriptions by *one* individual for 1869, 1870, and 1871, as *three* subscribers toward a premium. Every *new* subscriber should have the work from the beginning. Bound volumes may be counted in the same way—each as one subscriber—except, of course, when they are obtained as a premium.

Do not fail to note the following Points:

1. All subscribers sent by one person count, though from one or a dozen different post-offices. But

2. State with each name or list of names sent that it is for a premium.

3. Send the names as fast as obtained, that the subscribers may begin to receive the paper at once. You can have any time, from one to six months, to fill up your list,

4. Send the exact money with each list of names, so that there may be no confusion of money accounts.

5. Old and new subscribers all count in premium clubs, but a portion, at least, should be new names; it is partly to get these that we offer premiums to canvassers.

6. Specimen numbers, cards, and show-bills will be supplied free, as needed by canvassers; but they should be used carefully and economically, as they are very costly.

7. Remit money in Checks on New York banks or bankers, payable to order of WESTERN & COMPANY, or send Post-Office Money Orders. If neither of these is obtainable, Register Money Letters, affixing stamps both for the postage and registry; put in the money and seal the letter in the presence of the postmaster, and take his receipt for it. Money sent in any of the above ways is at our risk.

DESCRIPTIVE LIST OF PREMIUMS.

Every Premium in the annexed list is described in the December MANUFACTURER AND BUILDER, *and also in a* **Special Descriptive Sheet,** *which will be sent* **free** *to every one desiring it. We have room here for the following only:*

No. 1—Chest of Good Tools.—We are able, through the special favor of Messrs. Patterson Brothers, of 27 Park Row, to offer chests of the very finest quality of tools, of kinds and prices named below. Similar tools could be purchased for half the money; but these are all A No. 1, for practical use, and worth a dozen common articles. For this we have the guarantee of Messrs. Patterson, which is amply sufficient for us, and for all who know them. Any of these tools may be ordered of them. We make up only a single premium, which contains a full assortment for all common purposes. The tools are of regular size, and but few additions would be required for a journeyman carpenter. The assortment we offer is as follows: 1 tool-chest, $8; 1 jack-plane, $1 75; 1 smooth-plane, $1 50; 1 fore-plane, $2 25; 1 handsaw, 22 in., $1 75; 1 compass saw, 10 in., 50c.; compass, 6 in., 37c.; 1 adze-eye hammer, No. 4, $1 25; 1 hatchet, No. 2, 90c.; 1 draw-knife, 7 in., $1 12; 1 try-square, 6 in., 70c.; 1 bevel, 8 in., 75c.; 1 chalk-line and spool, 30c.; 1 mallet, 30c.; 1 pair of pliers, (steel,) 5 in., 60c.; 1 pair of calipers, 4 in., 30c.; 1 brace, No. 2, $2 25; 1 auger-bit, ea., ¼ in., 30c.; ⅜ in., 32c.; ½ in., 45c.; 1 in., 60c.; 1 centre-bit, ea., ¼ in., 21c.; ¾ in., 23c.; 1 in., 25c.; 1¼ in., 35c.; 1½ in., 40c.; 6 gimlet-bits, assorted, 90c.; 3 gimlet-bits, assorted, 33c.; 1 screw-driver bit, 25c.; 1 flat countersink, 25c.; rose, do., 25c.; snail, do., 25c.; 1 octagon reamer, 30c.; 1 taper-bit, 30c.; 1 screw-driver in handle, ea., 3 in., 30c.; 6 in., 50c.; 1 gouge in handle, ea., ½ in., 50c.; 1 in., 70c.; 1 chisel in handle, ea., ¼ in., 30c.; ½ in., 35c.; ¾ in., 40c.; 1 in., 50c.; 1¼ in., 60c.; 1 framing-chisel, ea., ¾ in., $1; 1 in., $1 10; 1¼ in., $1 20; 1 auger, ea., ¾ in., 70c.; 1 in., 80c.; 1¼ in., 90c.; 1 set bradawls in handles, $1 35; 1 rule, 2 feet, 25c.; 1 saw file, ea., 4 in., 14c.; 5 in., 17c.; 1 flat bastard file, 8 in., 30c.; 1 wood-rasp, 50c.; 1 soldering copper, 60c.; solder nails, etc., $1 25;—**$45 00.**

Nos. 2, 3—Mathematical Instruments for Draughting, Drawing, Etc.—Very convenient not only for architects and mechanics, but for boys and girls. These are neatly fitted in beautiful rose-wood cases, having dividers with flexible joints, and points, semi-circles, pencil and penholders, rulers, etc., etc. All the pieces in No. 2 are finished in brass and steel; those in No. 3 are German-silver and steel. The pieces are the same in each, but No. 3 is of extra beauty and workmanship. 18 subscribers at $1 50 each secures No. 2, and 22 at $1 50 each, No. 3.

Nos. 4, 5, 6, 7—Pocket Knives.—Here's for the boys and girls. These premiums are among the most pleasing and useful that we have ever offered. Every boy, and girl too, wants a pocket knife. We give them an opportunity to obtain a most valuable one for merely a little effort. These knives are from Messrs. Patterson Bros. No. 4 is a neat, substantial knife, with three blades and buck-horn handle. No. 5 is a still finer article, with four blades and buck-horn handle. No. 6 is an elegant knife, with four blades and shell handle. No. 7 is a lady's pocket-knife, a beautiful article, with four blades and shell handle.

Nos. 8, 9, 10, 11, 12, 13—American Table Cutlery.—We are glad to be able to offer really good articles of American manufacture, such as are competing successfully with the best foreign goods. ***Messrs. Patterson Bros., 27 Park Row,*** who supply us with these articles, are also importers of English goods. They recommend these knives, manufactured by the ***Meriden Cutlery Co.,*** as equal to any cutlery in the market, and their recommendation is a guarantee wherever they are known. We offer four kinds of knives, and three sizes of each kind. No. 8 have rubber handles, which are actually boiling-water-proof, so that, if they were accidentally to remain in it for several minutes, or even hours, they would not be injured, The blades are of the best steel, and warranted Dessert size, with forks, sold at $14. For 23 subscribers at $1 50, or 78 at $1, we will give either the medium size or the table size, sold at $15 50. No. 9 have ivory handles, are selected with great care, have steel blades, and are beautiful goods. Dessert size, with forks, sold at $18 50. For 31 subscribers, at $1 50, or 100 at $1, we will send the medium size, sold at $20 50. For 34 at $1 50, or 112 at $1, we will send the table size, sold at $22 50. No. 10 are made of solid steel, and are triple plated all over with pure silver, which will wear for a long time, while the knife is actually indestructible by ordinary use. Dessert size, with forks, sold at $22. For 37 subscribers, at $1 50, or 118 at $1, we will give the medium size, sold at $24 50. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25, No. 11 have steel blades, triple-plated with silver, and larger ivory handles, and are really splendid goods. Dessert size, with forks, sold at $25 50. For 42 subscribers, at $1 50, or 128 at $1, we will give the medium size, sold at $28. For 45 subscribers at $1 50, or 143 at $1, we will give the table size sold at $30 50. The forks, which accompany these premiums, Nos. 8, 9, 10, are made of genuine albata, and warranted double-plated with coin-silver. The forks with No. 11 are warranted triple-plated with coin-silver. These forks are also furnished to us by Messrs. Patterson Bros. The carving-knife and fork, and fluted steel, are made by

PUBLICATIONS.

the Meriden Cutlery Co., with the best ivory balanced handles.

Nos. 14 to 29—Silverware for the Table.—What would become of elegance and refinement in the furnishing of homes if the ladies (God bless them!) had not such an amiable passion for endlessly beautifying everything around them? Ever since Eve first set out the fruit of Paradise on its broad leaves to entertain the angel guests of Adam, it has been the province of her lovely daughters to spread the social board with attractions still more tempting to the eye than to the palate. What, that becomes a woman, will not a woman do to make her table shine? We condole with them that their means are not always equal to their good taste, and propose that henceforth no lady shall lack a lustrous silver tea-set, or other piece of similar elegance, unless she chooses to. Look at the following premiums, all of the celebrated manufacture of Messrs, HALL, ELTON, & Co., 36 Park Row, New York; No. 28 is silver-plated, gold-lined, beautifully chased **Tea Set** of six pieces, consisting of a coffee-pot, two tea-pots, a creamer, a sugar-bowl, and a slop-bowl. The style of this set is very neat, new and elegant. Messrs. Hall, Elton & Co, warrant these goods to be their best triple plate. This is a very desirable premium. No. 29 is a tea-set with same number of pieces, triple-plated, plain, new style.

Nos. 31, 32, 33, 34, 35—GOLD PENS, Rubber Mounted with Ever-Pointed Pencils—Pens in Gold and Silver Holders—Pens and Pencils in Extension Cases.—No. 31 has a gold-mounted rubber case, with pencil, and a No. 4 gold pen, manufactured by MABIE, TODD & Co., 180 Broadway, New York. This and the next, No. 32, are, we think, really the best things of the kind manufactured. The fact that hard rubber is used, shows that the gold for the mountings, etc., is of the finest quality, as rubber, on account of the sulphur contained in it, can not be mounted with any other without tarnishing. When closed, the pencil No. 31 is only 5 inches long, (No. 32, 3¼ inches,) but it opens to a length of 5¾ inches. The price for the holder and pencil of No. 31 is $6, pen $2; and of No. 32, or smaller size, $5 for the case, and $1 75 for the pen. Fifteen subscribers will give you the former, or gentleman's size, and 13 the latter, or lady's size. No. 33 is a No. 6 gold pen, with silver or gold-plated holder with an ebony handle—a very neat, desirable business-pen. By describing the kind of pen you prefer, we can probably select one that will suit your hand perfectly. We send these by mail, in a neat turkey morocco box, lined with velvet, in which they can be kept, protected from injury. No. 34 is a large pen, in a fine extension case, round or fluted, and richly engraved. The gold is 14 carats fine. These pens, which are nicely put up in boxes, are a very beautiful thing for a present. Price $20, and sent, postage paid, to any address, upon receipt of 29 subscribers at $1 50 each. No. 35 is a lady's gold pen, with ivory holder. Price, $2 75. This is indeed a very neat and beautiful pen for ladies' use. We send it, postpaid, by mail, inclosed in a handsome velvet-lined morocco box, for 6 subscribers.

No. 38—The Celebrated St. Germain or German Student's Lamp.—as it is sometimes called. This lamp is made and furnished to us by C. F. A. HINRICHS. It scarcely needs eulogium, being the standard thing in our leading colleges, both among students and professors. They reject gas, even where it is most plentiful and convenient, and save their much-worked eyes by the motionless pure white light for which this lamp is so remarkable. No other artificial illumination approaches so nearly to the still colorless sunlight. The secret is in the scientific adaptation of burner and chimney to produce that perfection of draught by which absolute combustion is attained without vibration. The porcelain shade softens the light most agreeably. The lamp slides on a vertical standard, and is adjusted by a set-screw at any desirable elevation to accommodate the work or the eyes. The reservoir is elevated above and at a short distance from the burner, (communicating by a pipe,) so that the oil is always cool and out of reach of flame. The reservoir can be taken out of its telescopic socket, and carried away to another room and filled and returned, without putting out the light. The lamp will be a treasure worth no little trouble to obtain to any one who needs strong light, or who values eye-sight, economy, neatness, pure air, and freedom from trouble and annoyance with lamps; as in all these points it is without a peer. The price of these lamps is $8, with 25 cents for packing. The mineral sperm oil can be had from most respectable dealers, or ordered in packages of any size (1 gallon upward) from Messrs. HENRY RUSSELL & Co., 38 Park Place, New-York.

No. 39—Family Scales.—These scales combining the advantages of counter and platform scales, are peculiarly adapted to household purposes. They weigh from ½ ounce to 240 lbs. They have a scoop or pan for weighing flour, sugar, and other house stores, and a platform for heavier articles, and are just such an apparatus as is needed for in-door or out-door use, occupying less than two feet square. These scales are manufactured by the well-known FAIRBANKS & Co., No. 252 Broadway New York, whose weighing apparatus has long ranked as the standard in all parts of the country. Send to them for circulars, if desired.

Nos. 45.53—Bailey's Patent Planes.—To those who have used these planes and know their value, is but small praise to say that they are superior to any others made. They are so far ahead of any others that there can be no comparison between them. They are self-adjusting in every respect. Both the wood and iron planes are entirely independent in themselves, requiring neither hammer, screw-driver, nor wrench to replace or adjust the cutter, which is held firmly in place and can be instantly released by use of the cam and its thumb-piece. The cutter is adjusted by simply turning a thumb-screw under the bed-piece upon which the plane-iron rests. By this the cutter can be adjusted to any thickness of shaving. The Stanley Rule and Level Co., 55 Chambers Street, New York, warrant these planes to be of the best stock and finish. The various numbers and sizes of these planes which we offer gives carpenters, mechanics, and others desiring them, an opportunity to get a complete set of either the wood or iron planes as premiums. The smooth planes, of which we offer two sizes, are 5¼ inches long, 1¾ inch cutter; and 8 inches long, 1¾ inch cutter.

Jack plane..	14	in. long,	2	in. cutter.	} Iron.
Fore "	18	" "	2⅜	" "	
Jointer "	22	" "	2⅝	" "	

In the wood planes the lengths and widths of cutter embrace all sizes made. Forty-four subscribers at $ .50 each, or 141 subscribers at $1 each, will get a complete set of the wood-planes. Sixty-nine subscribers at $1.50 will get a complete set of the iron planes, which will last a life-time. If larger sizes than those given are wanted, a few extra subscriptions will be required, according to the difference in the price.

Nos. 54-76—Machinists' Tools.—This series of premiums, consisting of machinists' tools, etc., has been selected and put up at the suggestion of several practical men with whom we have consulted in regard to the subject. These gentlemen, who have a practical knowledge of the tools, and of the requirements of all who have any thing to do with the working of metals, give their unqualified approval of the tools we have selected. This list of premiums has been made so extensive that every man who has any industrial operations to carry on will find some tool or tools absolutely necessary to him. By sending us clubs of subscribers to THE MANUFACTURER AND BUILDER these tools may be obtained by the smallest possible amount of labor. Of the qualities of these tools, in point of finish, we know them to be the best in the market—the best, without challenge. When a man has a set of any of them in his tool-chest, he knows he has the means of producing work equal to any that can be done. We obtain these tools from the general agents, Messrs. POST & GODDARD, 109 Liberty Street, New York.

No. 77—Foot-Lathe No. 1.—Of these useful articles we offer two kinds. No. 1 is perfectly adapted for most kinds of turning in wood or metals; also drilling, boring, polishing, sawing, etc. It seems to be the size desired by most people. This lathe is proved by the great numbers of them sold. This lathe takes a piece between centres 19 inches long and 6¼ inches wide in diameter. It weighs 200 pounds. It is fitted with two pointed centres, one spur-centre, face-plate turned and polished, two rests, one 9 and the other three inches long; also centre key and wrench combined, which fits the screw heads in different parts of the lathe. The balance-wheel weighs 45 pounds, is turned true, and is polished. It has two sizes for change of speed. This size of lathe has a great many extra parts made for it, so that whenever they are wanted they can be obtained. This is a very valuable point, as in buying other machines of the kinds only such things as happen to fit can be used, and they are not always to be found when wanted. The Rev. JOHN TODD, D.D., speaking of lathes, says in regard to these, "For price, for finish, for beauty and workmanship, I have never seen any American lathe so desirable. Of the No. 1 he says: "Nobody can own the lathe without daily gratitude." We procure these lathes through Mr. LUCIUS W. POND, 98 Liberty street, the well-known manufacturer of machinists' tools. Few people can obtain one of these lathes more easily than by obtaining 65 subscribers for THE MANUFACTURER AND BUILDER, for which we ship this premium, without any additional charge for boxing. The regular price is $50. We include leather belt 8 feet long, which costs 90 cents in the price given in the table.

No. 78—Foot Lathe, No. 2.—Our subscribers are frequently asking for second-hand lathes, saying at the same time that such a one would answer their purpose, and probably come cheaper. There are many others who do not care for so complete a lathe as No. 1. The No. 2, we think, will answer this demand. It is made of cheaper materials, but in the same style as lathe No. 1. The frame is of wood, with curved legs, which give it a neat and attractive appearance. It is painted and ornamented in the best style. The bed is made with iron slides three feet long. Will take a piece between centres 21 inchhes long and 6¼ inches in diameter. It has an iron pulley like No. 1. The spindle runs accurately. The face-plate takes off, and the centres are fitted to tapering sockets. Tailstock spindle traverses with a left-hand screw. Everything is well fitted and finished. The balance-wheel is the same pattern as for lathe No. 1, and is turned true. The lathe, with face-plate, long and short T rests, two pointed centres, spur-centre, and wrench, packed for transportation, costs $30. For this we also include the leather belt, 8 feet long, which is used on the driving wheel. We box this lathe and deliver it on the cars for a club of 47 subscribers at $1 50 each, or 124 at $1. The twist-drills and chucks—premiums 65, 68, and 69 to 73—especially the smaller sizes, are just the things for these lathes. The chucks, No. 0x, 2 and 3, cost $2 extra for fitting in the lathe. Those desiring further information in regard to the premium may send to WESTERN & Co., 37 Park Row, New York, for an illustrated pamphlet.

No. 79—The Dollar Steam-Engine.—This is a real working steam-engine and boiler, which runs half an hour, or until its fill of water is evaporated, by means of a small spirit-lamp, which forms a part of it. It can not explode or get out of order. A most instructive as well as entertaining toy. Sent, prepaid, for 5 subscribers at $1 50. It is manufactured by COLBY BROTHERS & Co.

Nos. 80, 81, 82, 83—Compact and Powerful Portable Steam-Engine and Boiler.—BAXTER'S patent is acknowledged by many experienced engineers to be the most perfect combination, of standard principles exclusively, and thorough workmanship, ever made in a portable engine. At the same time such is its compactness and the scale and system on which it is manufactured, (by the Colt Armory, at Hartford, Ct.,) that it is afforded at the lowest price ever known for the same (actual) power. It is made by machine tools constructed expressly for it, of standard interchangeable parts throughout, like the celebrated American watches. Consequently we are able to make it one of our most attractive and valuable premiums. Besides, it is warranted to consume less fuel per horse-power than any other engine. This is in consequence, partly, of the improved arrangement of the boiler and the cylinder being entirely let into the steam-space, to save room and heat. The one-horse engine and boiler (which, like the others, will run above, not below rated power) stands but five feet high, over all, by two feet in diameter. This is premium No. 80, costs $300, and can be had for 320 subscribers at $1 50 each, or 1125 at $1 each. The five-horse engine and boiler stands 6¼ feet high by 3 feet in diameter, costs $800, and can be had for 858 subscribers at $1 50 each. The ten-horse engine costs $1200, and will run a good sized manufactory. There is now no reason why any body should be without a first-class steam-engine, especially as these engines are so simple, snug, safe, and economical of fuel that they can be run in any apartment by the fire required to warm it, and by and person of common intelligence, and will be received from the factory in perfect readiness for use. For running small lathes, drills, etc., circular and scroll saws, printing-presses, corn-huskers, cider-mills, fanning-mills, feed-mills, cotton-gins and hullers, cheese-presses, churns, pumps, washing-machines, sewing-machines, rotary blowers for forges and other purposes, etc., the smallest of these engines will be found thoroughly effective, and as little incumbrance and trouble as a kitchen stove. For business, however, we recommend to try for one of ample rather than of bare sufficiency.

Nos. 84, 85, and 86—Steam-Pumps.—These steam-pumps are of the best class and quality, economical in the use of steam, and capable of being applied in various ways. No. 84 is one of Hardick's manufacture, which took the first prize at the Fair of the American Institute a year ago. Nos. 85 and 86 are two sizes of the celebrated Cameron pump. Nos. 1 and 2. The first has a steam cylinder 4¼ by 7 inches, and its capacity of ordinary speed is 15 gallons per minute, and costs $150. Size No. 2 has a steam cylinder 6 inches in diameter, with 8-inch stroke. It costs $200, and is capable at ordinary speed of delivering 30 gallons of water per minute. These pumps are remarkable for their compactness, simplicity, and durability. The valves are large and not liable to become choked up. By simply removing the bonnet, access can be had to them for inspection or repair,

Nos. 105 to 108—To Procure a Patent without Money.—We have met with many having valuable inventions, which inventors are anxious to get patented, but are unable to afford the expense, and consequently fail to secure the profits which a patent might produce. To such as are in this position, we make the following liberal offer: No. 108—We will prepare an application for a patent, attend to its passage through the Patent Office, and pay all government fees and incidental expenses attending the same, for any inventor presenting a patentable invention, who will get up a club of seventy-five subscribers for THE MANUFACTURER AND BUILDER for one year at $1,50 each, or 250 at $1 each, and send us the money by post-office order. If this application should be rejected, they may send us an additional list of thirty subscribers at $1.50 each, and the subscription money for the same, on receipt of which we will prepare and prosecute a second application, paying all government fees and incidental expenses. No. 107—For a list of fifty subscribers at $1.50 each, or 150 at $1 each, with the cash accompanying it, we will prepare an application, attend to its passage through the office, and pay the government fee ($15), the applicant paying the second government fee of $20. No. 106—For a list of thirty-five subscribers at $1.50, sent in the same way, we will prepare and prosecute an application, the applicant paying the government fee. No. 105—for twenty-eight subscribers at $1.50 each, or eighty at $1 each, we will prepare and file a caveat, furnish the necessary drawings, (which we also furnish in all the above cases), and pay all government fees. All cases placed in our hands under these arrangements will receive our best attention, equally with those for which our fees have been paid in cash, and will be appealed to the Board of Examiners-in-Chief if necessary, the applicant paying the government fee of $10 on such appeal. If the inventor has no model to accompany his application, he may procure additional subscribers, the premium on which (see cash rates) will enable him to pay for the model. A club of 100 names has been obtained in a single establishment where from 150 to 200 hands are employed. A village of 500 inhabitants will take this number readily.

No. 129—Sewing Machines.—Your choice! A $65 machine for 65 subscribers, at $1.50 each.—It makes no difference to us which machine we send, or whether it is selected at first or at the last moment. No charge for boxing the machines; they go safely as freight. For circulars, giving full particulars in regard to style of machines, fixtures, etc., as well as instructions, send to **Grover & Baker Manufacturing Co., 495** Broadway, New York; **Florence Sewing Machine Co., 505** Broadway, New York; **Wilcox & Gibbs Sewing Machine Co., 658** Broadway, New York; **Singer Sewing Machine Co., 458** Broadway, New York.

Nos. 137, 138—Volumes of the Manufacturer and Builder.—The unbound volumes of THE MANUFACTURER AND BUILDER consist of a set of number for a year, each separate in its own paper cover. These volumes amount to a valuable Library on all matters pertaining to the Industrial Arts, and contain more varied information on manufacturing building, and mechanical subjects than can be obtained in books costing three times as much. The price of the volumes unbound is $1.50 each, at the office, or $1.75 if sent by mail, as they must be post-paid. They are profusely illustrated, the engravings used in them having alone cost thousands of dollars. For ordinary use, the sets of numbers unbound will answer quite well.

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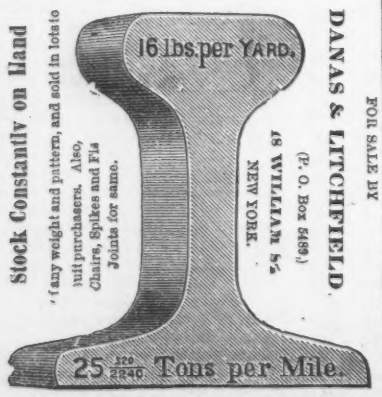

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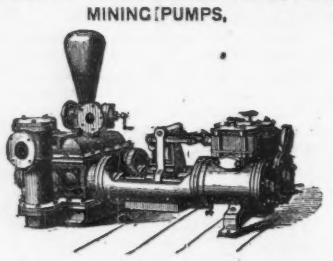

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U. S. PATENT OFFICE,
WASHINGTON, D. C., May 26, 1871.

On the petition of THOMAS J. CHUBB of New York N. Y., praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Separating Ore.

It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extention., M. D. LEGGETT, Commissioner.

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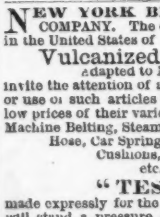

U. S. PATENT OFFICE,
WASHINGTON, D. C., May, 25, 1871.

On the petition of CHARLES H. SAYRE of Utica, New York, praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Cultivators.

It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

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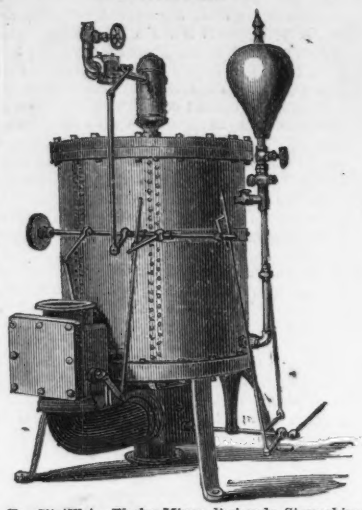

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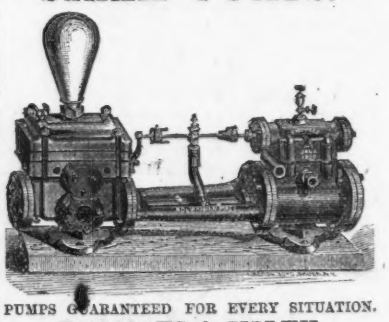

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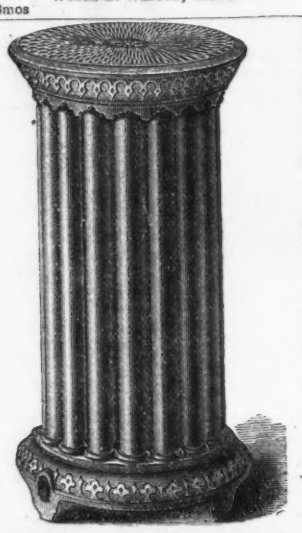

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U. S. PATENT OFFICE,
WASHINGTON. D. C., May 11, 1871.

On the petition of JOHN TOULMIN of Worcester, Mass., praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Vibrating Shears.

It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

U. S. PATENT OFFICE,
WASHINGTON, D. C., May 11, 1871.

On the petition of JOSEPH W. BUDD of Midland City, Michigan, Administrator of ISRAEL DODENHOFF, deceased, praying for the extension of a patent granted to the said ISRAEL DODENHOFF, on the 18th day of August, 1857, for an improvement in Raking Apparatus for Harvesters.

It is ordered that the testimony in the case be closed on the 18th day of July next, that the time for filing arguments and the Examiner's report be limited to the 28th day of July next, and that said petition be heard on the 2d day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner,